JOSEPH BECK. ROBERT KEMP. CHARLES COPPOCK.

AN ILLUSTRATED CATALOGUE

OF

MICROSCOPES AND OTHER SCIENTIFIC INSTRUMENTS,

MANUFACTURED BY

R. & J. BECK,

LONDON.

AND

No. 921 CHESTNUT STREET,

PENN MUTUAL INSURANCE COMPANY'S BUILDING,

PHILADELPHIA.

W. H. WALMSLEY, Manager.

PRICE TEN CENTS.

NOTICE.

There are some few changes of prices and numbers in the present edition of this Catalogue; and all *former editions are superceded by this.* In ordering please mention the number of the edition.

Terms Cash, at the prices stated, which have been materially reduced from former rates. *Discounts cannot be given exeepting to Dealers.*

When the party ordering goods is unknown to us, the money should accompany the order, either by Bank Draft or Postal Money-Order. *Money should never be sent through the mails.* Where, however, this is not done, goods will be sent C. O. D., provided a small remittance accompanies the order to insure the prompt taking up of the package on receipt.

The Express Company's charges for collecting and returning money on C. O. D. bills must be paid by the party ordering the goods.

No articles containing glass can be sent by mail, excepting in sealed packages at letter postage of six cents per oz. Goods ordered to be sent by mail must be prepaid, and the amount included in the remittance.

All packing boxes will be charged for at cost prices, and all goods will be packed with the utmost care; *but no responsibility* will be assumed by us, for *breakage* or other *damage, after* a package *leaves our premises*, except upon special contract.

Institutions of Learning and Scientific Societies, being entitled by law to import instruments for their own use *Duty Free*, we are prepared to execute all such orders promptly, not only for apparatus of our own manufacture, but that of any other makers in Europe; and to deliver the same, at makers' Catalogue prices, free of all shipping or freight charges.

We would also state that in March, 1877, our American agency was withdrawn from the house of James W. Queen & Co., since which we have not supplied them with any of our instruments, nor can they supply any of our recent and *genuine* manufactures.

R. & J. BECK.

March 30, 1878.

ILLUSTRATED PRICE LIST

OF

MICROSCOPES,

MICROSCOPIC APPARATUS

AND OTHER

SCIENTIFIC INSTRUMENTS,

MANUFACTURED BY

R. & J. BECK,

LONDON.

"Vino Bono Non Opus Est Hedera."

AMERICAN BRANCH:

No. 921 CHESTNUT STREET,

PHILADELPHIA.

W. H. WALMSLEY, Manager.

PREFACE.

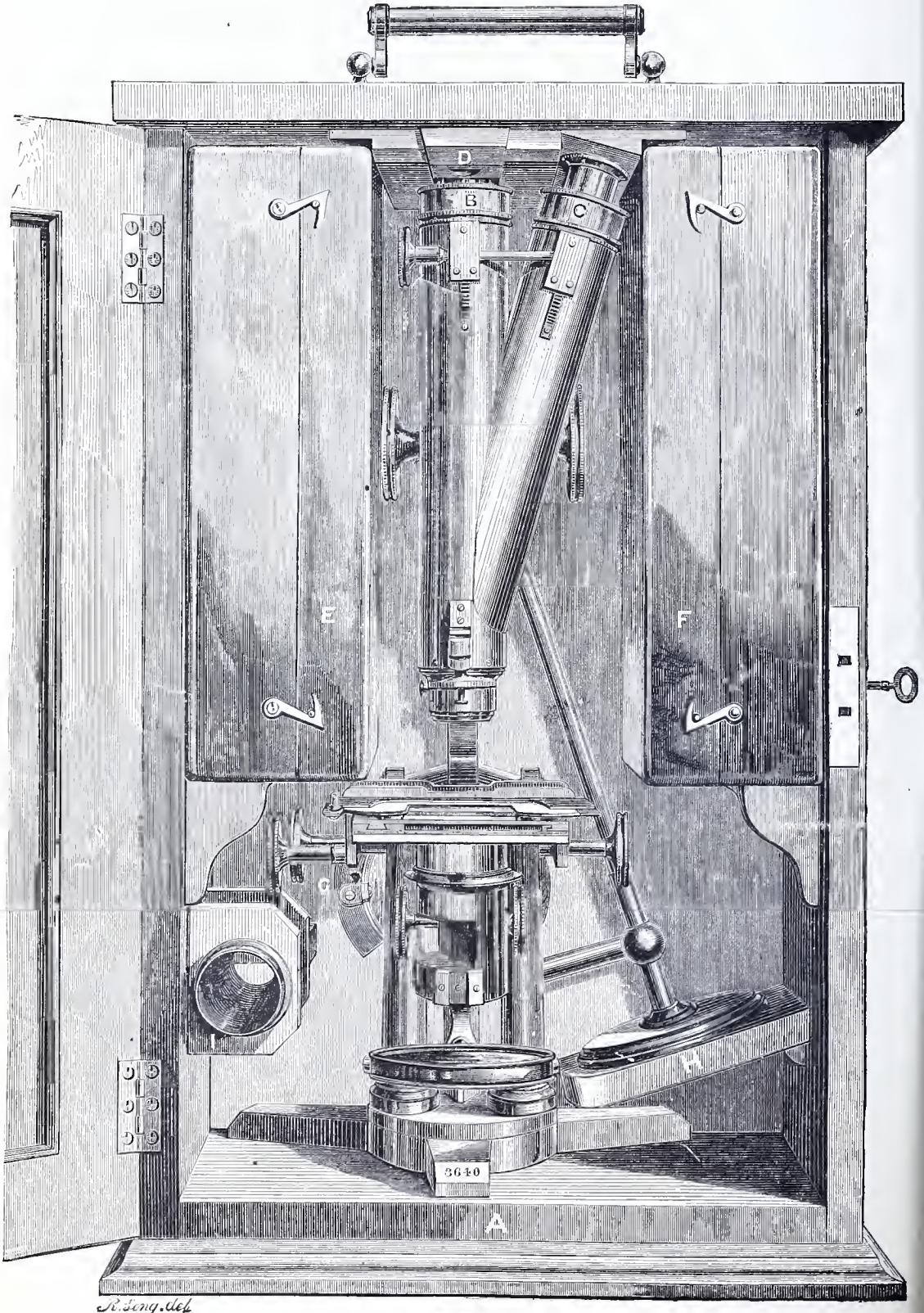
The demand for our Optical and other Scientific instruments in America, during the past Six years, has been so satisfactory and so steadily increasing, that we have opened a **Branch House** in Philadelphia, in order more fully to meet the advancing demand, under the management of **Mr. W. H. Walmsley**, who has hitherto conducted our American agency as a member of the firm of James W. Queen & Co., from which house our agency was withdrawn in March, 1877—since which time we have ceased to supply it with any of our goods.

In thus connecting ourselves more prominently and intimately with American business, we hope to be able to give our customers an opportunity of seeing what we can do in the superiority of our workmanship, and the moderation of our prices: two points essentially and equally necessary for success.

To our **Branch House** we shall forward all novelties as soon as produced, and shall keep in stock thereat, a full line of all our goods and specialties, including Microscopes and Accessories, with every description of preparations; Telescopes; Opera and Field-Glasses; Spectacles and Eye-Glasses; Thermometers—Standard, Self-registering, Clinical and Ordinary; Barometers—Mercurial, Metallic and Aneroid; of the most accurate character; and every description of Meteorological instruments. Not confining ourselves however to the sale of our own manufactures exclusively, we shall be prepared to furnish those of all the well-known houses both in London and on the Continent; also those of American makers, at their lowest prices.

All the following articles are of strictly first-class workmanship, and warranted to give satisfaction.

R. & J. BECK.



No. 1.

FIRST-CLASS MICROSCOPES.

PRICE $140.

No. 1. ***New Large Best Binocular Microscope, with Concentric Rotating Stage, Centering and Rotating Sub-Stage and Iris Diaphragm, with all the Latest Additions Complete.***

12 Object-glasses, magnifying from 8 to 10,000 linear:—4 in. (8°), 3 in. (12°), 1½ in. (23°), ⅔ in. (32°), $\frac{4}{10}$ in. (55°), $\frac{4}{10}$ in. (90°), ¼ in. (75°), ⅕ in. (100°), ⅛ in. (120°), $\frac{1}{10}$ in. immer. (160°), $\frac{1}{20}$ in. (140°), $\frac{1}{40}$ in. (140°).

Lieberkuhns to the following Object-glasses:— 1½, No. 89, ⅔, No. 90, $\frac{4}{10}$, No. 91, ¼, No. 92.

10 Eyepieces, viz. 1 pair No. 1, 1 pair No. 2, 1 pair No. 3, 1 No. 4, 1 No. 5, No. 97, 1 pair Kelner's Eyepieces, No. 96. Indicators to 6 Eyepieces, No. 152. Graduated Draw-tube, No. 100. Erecting-Glass, No. 99, for use with the ⅔ Object-glass for erecting the Image and varying the power from 5 to 150 linear. Achromatic Condenser, with revolving Diaphragm, No. 101. Right-angle Prism, No. 104. Brown's Iris Diaphragm, No. 113. Amici's Prism, No. 105. Nachet's Prism, No. 107. Wenham's Parabolic Reflector, No. 108. Spot-Lens, No. 110. Rainey's Moderator, No. 135. White-ground Illuminator, No. 127. Polarizing Apparatus, No. 116. Darker's Series of Selenites, No. 117. Sorby's Micro-Spectroscope, No. 66. Sorby's Standard Spectrum-scale, No. 67*. Sorby's Dichroiscope, No. 67. Leeson's Goniometer, No. 154. Tourmaline, No. 125. Two Double-image Prisms, and Selenite Film, and Brass Plate with holes, No. 123. Set of 6 Crystals, showing rings round the optic axis, No. 124. Large Bull's-eye Condensing-Lens, No. 130. Smaller Side Condenser, No. 131. Side Silver Reflector, No. 133. Parabolic Illuminator with Sorby's Reflector, No. 129. Beck's Patent Illuminator, No. 126. Three Dark Wells and Holder, No. 136. Opaque Disk Revolver, No. 138. Quadruple Nosepiece in Aluminium, No. 161. Wollaston's Camera Lucida, No. 155. Neutral-Tint-Glass Camera, No. 156. Eyepiece Micrometer, No. 146. Stage Micrometer, No. 147. Set of Live-Traps, No. 173. Lever Compressor, No. 162. Wenham's Compressor, No. 165. Parallel-plate Compressor, No. 163. Reversible Compressor, No. 164. Screw Live-Box, No. 166. Large Live-Box, No. 167. Small Live-Box No. 168. Growing-Cell, No. 172. Two Large Troughs, No. 169. Two Glass Plates with Ledge and Covers, No. 171. Set of Three Glass Fishing-Tubes, No. 180. Maltwood's Finder, No. 150. Frog-plate, N. 175. Mineral-holder, No. 145. Three-pronged Forceps, No. 143. Tightening-Key, No. 181. Stage Forceps, No. 144. Brass Pliers.

The whole packed in an Upright Spanish Mahogany Case, with two boxes containing the Apparatus.

PRICE $1050.

No. 2. ***New Large Best Binocular Microscope, with Concentric Rotating Stage, Centering and Rotating Sub-Stage and Iris Diaphragm, with the following Apparatus.***

9 Object-glasses, magnifying from 12 to 5000 linear:—3 in. (12°), 1½ in. (23°), ⅔ in. (32°), $\frac{4}{10}$ in. (90°), ¼ in. (75°), ⅕ in. (100°), ⅛ in. (120°), $\frac{1}{10}$ in. immer. (160°), $\frac{1}{20}$ in. (140°).

Lieberkuhns to the following Object-glasses:—1½, No. 89, ⅔, No. 90, $\frac{4}{10}$, No. 91, ¼, No. 92.

7 Eyepieces, viz. 1 pair No. 1, 1 pair No. 2, 1 pair No. 3, 1 No. 4, No. 97. Indicators to 4 Eyepieces, No. 152. Graduated Draw-tube, No. 100. Erecting-Glass, No. 99, for use with the ⅔ Object-glass, for erecting the Image and varying the power from 5 to 150 linear. Achromatic Condenser, with revolving Diaphragm, No. 101. Right-angle Prism, No. 104. Plain Diaphragm. Amici's Prism, No. 105. Nachet's Prism, No. 107. Wenham's Parabolic Reflector, No. 108. Spot-Lens, No. 110. Polarizing Apparatus, No. 116. Darker's Series of Selenites, No. 117. Two Double-image Prisms and Selenite Film, and Brass Plate with holes, No. 123. Large Bull's-eye Condensing-Lens, No. 130. Smaller Side Condenser, No. 131. Parabolic Illuminator, No. 128. Three Dark Wells and Holder, No. 136. Opaque Disk Revolver, No. 138. Quadruple Nosepiece in Aluminium, No. 161. Wollaston's Camera Lucida, No. 155. Eyepiece Micrometer, No. 146. Stage Micrometer, No. 147. Lever Compressor, No. 162. Wenham's Compressor, No. 165. Parallel-plate Compressor, No. 163. Screw Live-Box, No. 166. Large Live-Box, No. 167. Small Live-Box, No. 168. Large Glass Trough, No. 169. Two Glass Plates with Ledge and Covers, No. 171. Set of Three Glass Fishing-Tubes, No. 180. Maltwood's Finder, No. 150. Frog-plate, No. 175. Mineral-holder, No. 145. Tightening-Key, No. 181. Stage Forceps, No. 144. Brass Pliers.

The whole packed in an Upright Spanish Mahogany Case, with two boxes containing the Apparatus.

PRICE $1000.

No. 3. ***New Large Best Monocular Microscope, with Concentric Rotating Stage, Centering and Rotating Sub-Stage and Iris Diaphragm.***

With the same Object-glasses and Apparatus as No. 2.

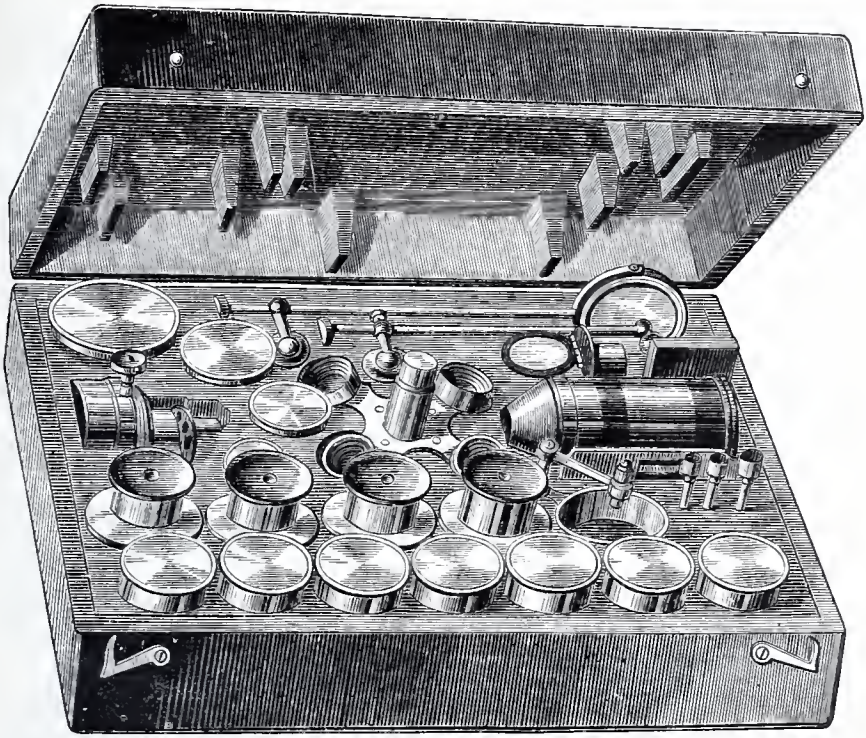
PRICE $675.

No. 4. ***New Large Best Binocular Microscope, with Concentric Rotating Stage, Centering and Rotating Sub-Stage and Iris Diaphragm, with the following Apparatus.***

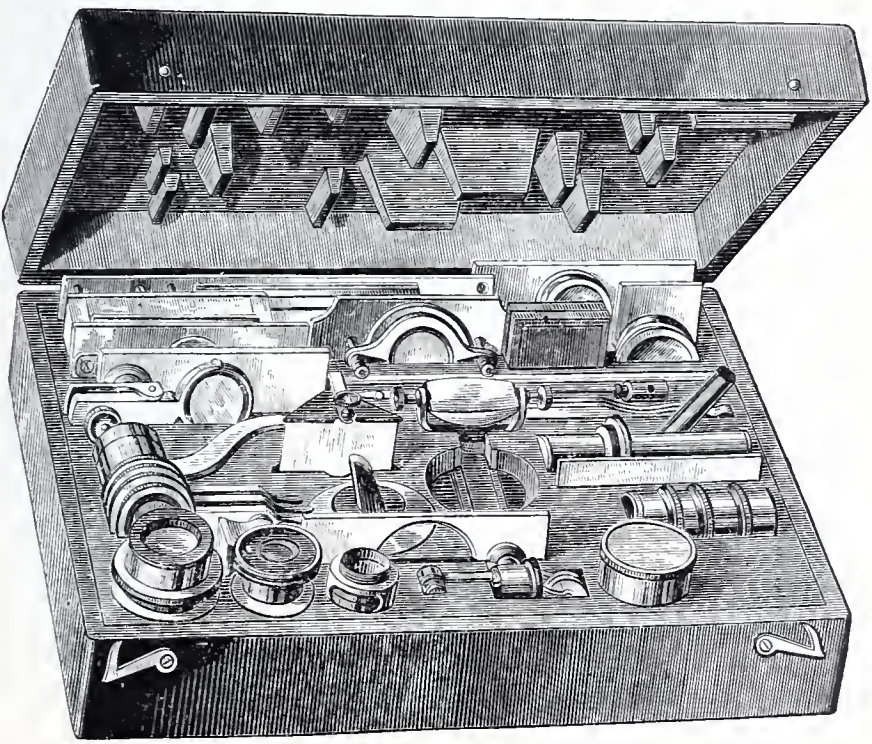
5 Object-glasses, magnifying from 30 to 1399 linear:—1½ in. (23°), ⅔ in. (32°), $\frac{4}{10}$ in. (55°), ⅕ in. (100°), ⅛ in (120°).

Lieberkuhns to the following Object-glasses:—⅔, No. 90, $\frac{4}{10}$, No 91.

6 Eyepieces, viz. 1 pair No. 1, 1 pair No. 2, 1 pair No. 3, No. 97. Indicators to 2 Eyepieces, No. 152. Graduated Draw-tube, No. 100. Erecting-Glass, No. 99, for use with the ⅔ Object-glass, for erecting the Image and varying the power from 5 to 150 linear. Achromatic Condenser, with revolving Diaphragm, No. 101. Plain Diaphragm. Wenham's Parabolic Reflector, No. 108. Polarizing Apparatus, No. 116. One Selenite. Large Bull's-eye Condensing-Lens, No. 130. Smaller Side Condenser, No. 131. Parabolic Illuminator, No. 128. Three Dark



Accessory Box, No. 1.



Accessory Box, No. 1.

Wells and Holder, No. 136. Opaque Disk Revolver, No. 138. Double Nosepiece, No. 159. Wollaston's Camera Lucida, No. 155. Eyepieee Micrometer, No. 146. Stage Micrometer, No. 147. Wenham's Compressor, No. 165. Parallel-plate Compressor, No. 163. Large Live-Box, No. 167. Small Live-Box, No. 168. Large Glass Trough, No. 169. Two Glass Plates with Ledge and Covers, No. 171. Set of Three Glass Fishing Tubes, No. 181. Maltwood's Finder, No. 150. Mineral-holder, No. 145. Tightening-Key, No. 181. Stage Forceps, No. 144. Brass Pliers.

The whole packed in an Upright Spanish Mahogany Case, with one box containing the Apparatus.

PRICE $625.

No. 5. ***New Large Best Monocular Microscope, with Concentric Rotating Stage, Centering and Rotating Sub-Stage and Iris Diaphragm.***

With the same Object-glasses and Apparatus as No. 4.

PRICE $575.

No. 6. ***New Large Best Binocular Microscope, with Concentric Rotating Stage, Centering and Rotating Sub-Stage and Iris Diaphragm, with the following Apparatus.***

4 Object-glasses, magnifying from 30 to 700 linear:—1½ in. (23°), ⅔ in. (32°), $\frac{4}{10}$ in. (55°), ⅕ in. (100°).

Lieberkuhns to the following Object-glasses:—⅔, No. 90, $\frac{4}{10}$, No. 91.

6 Eyepieces, viz. 1 pair No. 1, 1 pair No. 2, 1 pair No. 3, No. 97. Indicator to 1 Eyepiece, No. 152. Graduated Draw-tube, No. 100. Erecting-Glass, No. 99, for use with the ⅔ Object-glass, for erecting the Image and varying the power from 5 to 150 linear. Achromatic Condenser, with revolving Diaphragm, No. 101. Plain Diaphragm. Wenham's Parabolic Reflector, No. 108. Polarizing Apparatus, No. 116. One Selenite. Large Bull's-eye Condensing-Lens, No. 130. Smaller Side Condenser, No. 131. Parabolic Illuminator, No. 128. Three Dark Wells and Holder, No. 136. Double Nosepiece, No. 159. Wollaston's Camera Lucida, No. 155. Eyepiece Micrometer, No. 146. Stage Micrometer, No. 147. Wenham's Compressor, No. 165. Large Live-Box, No. 167. Small Live-Box, No. 168. Large Glass Trough, No. 169. Two Glass Plates with Ledge and Covers, No. 171. Set of Three Glass Fishing-Tubes, No. 180. Maltwood's Finder, No. 150. Mineral-holder, No. 145. Tightening-Key, No. 181. Stage Forceps, No. 144. Brass Pliers.

The whole packed in an Upright Spanish Mahogany Case, with one box containing the Apparatus.

PRICE $500.

No. 7. ***New Large Best Monocular Microscope, with Concentric Rotating Stage, Centering and Rotating Sub-Stage and Iris Diaphragm.***

With the same Object-glasses and Apparatus as No. 6.

PRICE $425.

No. 8. ***New Large Best Binocular Microscope, with Concentric Rotating Stage, Centering and Rotating Sub-Stage and Iris Diaphragm, with the following Apparatus.***

3 Object-glasses, magnifying from 30 to 700 linear:—1½ in. (23°), ⅔ in. (32°), ⅕ in. (85°).

Lieberkuhn to the ⅔ Object-glass, No. 90.

6 Eyepieces, viz. 1 pair No. 1, 1 pair No. 2, 1 pair No. 3, No. 97. Indicator to 1 Eyepiece, No. 152. Graduated Draw-tube, No. 100. Erecting-Glass, No. 99, for use with the ⅔ Object-glass, for erecting the Image and varying the power from 5 to 150 linear. Achromatic Condenser, No. 102. Polarizing Apparatus, No. 115. One Selenite. Large Bull's-eye Condensing-Lens, No. 130. Smaller Side Condenser, No. 131. Parabolic Illuminator, No. 128. Three Dark Wells and Holder, No. 136. Large Live-Box, No. 167. Two Glass Plates with Ledge and Covers, No. 171. Tightening-Key, No. 181. Stage Forceps, No. 144. Brass Pliers.

The whole packed in an Upright Honduras Mahogany Case, with one box containing the Apparatus.

PRICE $375.

No. 9. ***New Large Best Monocular Microscope, with Centering and Rotating Stage, Centering and Rotating Sub-Stage.***

With the same Object-glasses and Apparatus as No. 8.

PRICE $325.

No. 10. ***New Large Best Binocular Microscope, with Concentric Rotating Stage, Centering and Rotating Sub-Stage and Iris Diaphragm, with the following Apparatus.***

2 Object-glasses, magnifying from 60 to 400 linear:—⅔ in. (32°), ⅕ in. (85°).

4 Eyepieces, viz. 1 pair No. 1, 1 pair No. 2, No. 97. Indicator to 1 Eyepiece, No. 152. Graduated Draw-tube, No. 100. Smaller Side Condenser, No. 131. Large Live-Box, No. 167. Two Glass Plates with Ledge and Covers, No. 171. Tightening-Key, No. 181. Stage Forceps, No. 144. Brass Pliers.

The whole packed in an Upright Honduras Mahogany Case, with one box containing the Apparatus.

PRICE $275.

No. 11. ***New Large Best Monocular Microscope, with Centering and Rotating Stage, Centering and Rotating Sub-Stage.***

With the same Object-glasses and Apparatus as No. 10.

PRICE $575.

No. 12. ***New Small Best Binocular Microscope, with Concentric Rotating Stage and Centering Sub-Stage.***

5 Object-glasses, magnifying from 20 to 1300 linear:—1½ in. (23°), ⅔ in. (32°), $\frac{4}{10}$ in. (55°), ⅕ in. (100°), ⅛ in. (120°).

Lieberkuhns to the following Object-glasses:—⅔ No. 90, $\frac{4}{10}$ No. 91.

6 Eyepieces, viz. 1 pair No. 1, 1 pair No. 2, 1 pair No. 3, No. 97. Indicators to 2 Eyepieces, No. 152. Graduated Draw-tube, No. 100. Erecting-Glass, No. 99, for use with the ⅔ Object-glass, for erecting the Image and varying the power from 5 to 150 linear. Achromatic Condenser, with revolving Diaphragm, No. 101. Wenham's Parabolic Reflector, No. 108. Polarizing Apparatus, No. 116. One Selenite. Large Bull's-eye Condensing-Lens, No. 130. Smaller Side Condenser, No. 131. Parabolic Illuminator, No. 128. Three Dark Wells and Holder,

No. 136. Opaque Disk Revolver, 1 tray of disks, No. 137. Double Nosepieee, No. 159. Wollaston's Camera Lucida, No. 155. Eyepiece Micrometer, No. 146. Stage Micrometer, No. 147. Wenham's Compressor, No. 165. Parallel-plate Compressor, No. 163. Large Live-Box, No. 167. Small Live-Box, No. 168. Large Glass Trough, No. 169. Two Glass Plates with Ledge and Covers, No. 171. Set of Three Glass Fishing-Tubes, No. 180. Maltwood's Finder, No. 150. Stage Forceps, No. 144. Brass Pliers.

The whole packed in a Strong Flat Spanish-Mahogany Case.

PRICE $500.

No. 13. ***New Small Best Monocular Microscope, with Concentric Rotating Stage and Centering Sub-Stage.***

With the same Object-glasses and Apparatus as No. 12.

PRICE $475.

No. 14. ***New Small Best Binocular Microscope, with Concentric Rotating Stage and Centering Sub-Stage.***

4 Object-glasses, magnifying from 20 to 720 linear:—1½ in. (23°), ⅔ in. (32°), $\frac{4}{10}$ in. (55°), ⅕ in. (100°).

Lieberkuhns to the following Object-glasses:—⅔, No. 90, $\frac{4}{10}$, No. 91.

6 Eyepieces, viz. 1 pair No. 1, 1 pair No. 2, 1 pair No. 3, No. 97. Graduated Draw-tube, No. 100. Erecting-Glass, No. 99, for use with the ⅔ Object-glass, for erecting the Image and varying the power from 5 to 150 linear. Achromatic Condenser, No. 102. Wenham's Parabolic Reflector, No. 108. Polarizing Apparatus, No. 115. One Selenite. Large Bull's-eye Condensing-Lens, No. 130. Smaller Side Condenser, No. 131. Parabolic Illuminator, No. 128. Three Dark Wells and Holder, No. 136. Double Nosepiece, No. 159. Wollaston's Camera Lucida, No. 155. Eyepiece Micrometer, No. 146. Stage Micrometer, No. 147. Wenham's Compressor, No. 165. Small Live-Box, No. 168. Large Glass Trough, No. 169. Two Glass Plates, with Ledge and Covers No. 171. Set of Three Glass Fishing-Tubes, No. 180. Maltwood's Finder, No. 150. Stage Forceps, No. 144. Brass Pliers.

The whole packed in a Strong Flat Spanish Mahogany Case.

PRICE $425.

No. 15. ***New Small Best Monocular Microscope, with Concentric Rotating Stage and Centering Sub-Stage.***

With the same Object-glasses and Apparatus as No. 14.

PRICE $275.

No. 16. ***New Small Best Binocular Microscope, with Concentric Rotating Stage and Centering Sub-Stage.***

2 Object-Glasses, magnifying from 60 to 720 linear:—⅔ in. (32°), ⅕ in. (85°).

Lieberkuhn to the ⅔ Object-glass, No. 90.

5 Eyepieces, viz. 1 pair No. 1, 1 pair No. 2, 1 pair No. 3, No. 97. Graduated Draw tube, No. 100. Erecting-Glass, No. 99, for use with the ⅔ Objeet-glass, for erecting the Image and varying the power from 5 to 150 linear. Smaller Side Condenser, No. 131. Three Dark Wells and Holder, No. 136. Parabolic Illumi-

nator, No. 128. Small Live-Box, No. 168. Two Glass Plates, with Ledge and Covers, No. 171. Stage Forceps, No. 144. Brass Pliers.

The whole packed in a Strong Flat Spanish-Mahogany Case.

PRICE $235.

No. 17. ***New Small Best Monocular Microscope, with Concentric Rotating Stage and Centering Sub-Stage.***

With the same Object-glasses and Apparatus as No. 16.

PRICES OF FIRST CLASS MICROSCOPE STANDS AND CASES,

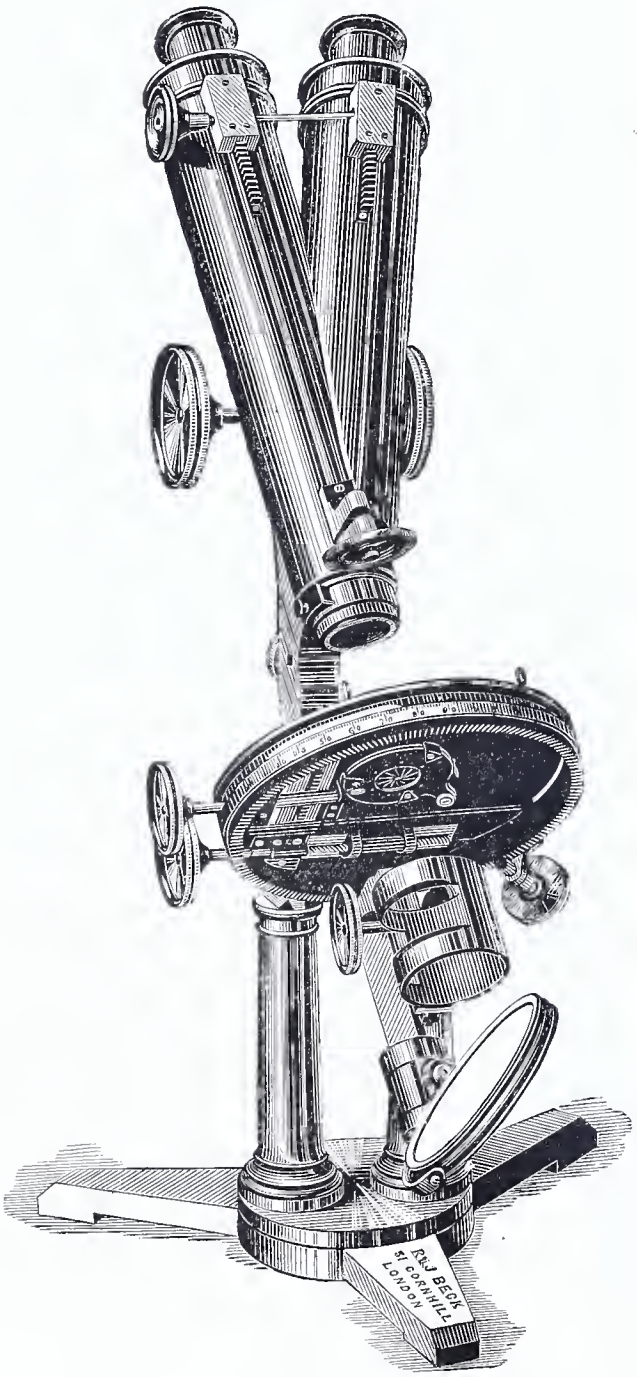
IF ORDERED SEPARATELY.

FIRST-CLASS MICROSCOPE STANDS.

No.		Price
36.	New Large Best Binocular Microscope Stand, with Concentric Rotating Stage and Iris Diaphragm, Rotating and Centering Sub Stage, most complete movements to the Body, Stage, and Double Mirror, Two pairs of Eyepieces, Pliers, Forceps, &c., mounted on two pillars,	$250 00
37.	New Large Best Monocular Microscope Stand, with Concentric Rotating Stage and Iris Diaphragm, Rotating and Centering Sub-Stage, most complete movements to the Body, Stage, and Double Mirror, Two Eyepieces, Pliers, Forceps, &c., mounted on two pillars. .	200 00
44.	New smaller Binocular Microscope Stand, on the same principle, and with the same actions as No. 36, Two pairs of Eyepieces, Pliers, Forceps, &c., but with single pillar, ...	150 00
45.	New smaller Monocular Microscope Stand, on the same principle, and with the same actions as No. 37, Two Eyepieces, Pliers, Forceps, &c., but with single pillar, ...	100 00

CASES FOR FIRST-CLASS MICROSCOPES.

46.	Best Upright Case, in Spanish Mahogany, for Nos. 40 and 41, with best brass handle, two boxes for Apparatus, ...	35 00
47.	Best Upright Case, in Spanish Mahogany, for Nos. 40 and 41, with best brass handle, only one box for Apparatus, ...	30 00
48.	Upright Case, in Honduras Mahogany, for Nos. 40 and 41, with best brass handle, two boxes for Apparatus, ...	25 00
49.	Upright Case, in Honduras Mahogany, for Nos. 40 and 41, with best brass handle, one box for Apparatus, ...	20 00
50.	Strong Flat Case, in Spanish Mahogany, with covered Dovetails (19 inches long by 9 inches wide, and 4 inches deep), for Nos. 42 and 43,	27 50
54.	Best Upright Case, in Spanish Mahogany, for Nos. 44 and 45, with best brass handle and box for Apparatus, ...	27 50
55.	Upright Case, in Honduras Mahogany, for Nos. 44 and 45, with best brass handle and box for Apparatus, ...	20 00
56.	Strong Flat Case, in Spanish Mahogany, with covered Dovetails, for Nos. 44 and 45, with best brass handle, ...	15 00



No. 36.

PRICES OF ACHROMATIC OBJECT-GLASSES AND APPARATUS FOR FIRST-CLASS MICROSCOPE STANDS.

ACHROMATIC OBJECT-GLASSES.

No.	Focal length.	Linear magnify'g pow'r nearly, with eyepieces.	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	Angle of aperture, about.	Price.
								°	$ c.
70	4 inches	Draw-tube closed.....	10	16	26	32	52	9	15 00
		Ditto if drawn out, add for each inch.....	1½	3	5	6	8		
71	3 inches	Draw-tube closed	12	20	40	48	74	12	27 50
		Ditto if drawn out, add for each inch.....	2	4	6	7	10		
72	2 inches	Draw-tube closed.....	20	38	70	85	130	18	27 50
		Ditto if drawn out, add for each inch.....	4	6	8	12	15		
73	1½ inches	Draw-tube closed.....	30	56	100	120	190	23	27 50
		Ditto if drawn out, add for each inch.....	5	7	12	15	22		
74	⅔ inch	Draw-tube closed.....	70	120	220	270	410	32	25 00
		Ditto if drawn out, add for each inch.....	8	14	25	27	48		
75	$\frac{4}{10}$ inch	Draw-tube closed.....	120	210	370	460	710	55	40 00
		Ditto if drawn out, add for each inch.....	14	24	34	46	70		
76	$\frac{4}{10}$ inch	Draw-tube closed.....	146	255	460	560	890	90	60 00
		Ditto if drawn out, add for each inch.....	18	32	48	60	80		
77	¼ inch	Draw-tube closed.....	200	340	590	720	1120	75	40 00
		Ditto if drawn out, add for each inch.....	24	42	63	85	120		
78	⅛ inch	Draw-tube closed.....	225	400	700	860	1450	85	40 00
		Ditto if drawn out, add for each inch.....	18	35	60	80	130		
79	⅛ inch	Draw-tube closed.....	225	400	700	860	1450	100	50 00
		Ditto if drawn out, add for each inch.....	18	35	60	80	130		
80	⅛ inch	Draw-tube closed.....	400	680	1180	1440	2240	120	65 00
		Ditto if drawn out, add for each inch.....	50	85	140	180	280		
81	$\frac{1}{15}$ inch immer.	Draw-tube closed.....	500	870	1500	1850	2800	160	50 00
		Ditto if drawn out, add for each inch.....	60	100	180	190	370		
82	$\frac{1}{20}$ inch	Draw-tube closed.....	900	1570	2750	3450	4950	140	120 00
		Ditto if drawn out, add for each inch.....	80	150	300	350	900		
83	$\frac{1}{20}$ inch immer.	Draw-tube closed.....	900	1570	2750	3450	4950	170	110 00
		Ditto if drawn out, add for each inch.....	80	150	300	350	900		
84	$\frac{1}{25}$ inch	Draw-tube closed.....	1800	3140	5500	6900	9900	140	150 00
		Ditto if drawn out, add for each inch.....	160	360	600	700	1800		

LIEBERKUHNS FOR OBJECT-GLASSES.

No.	Object-glass.	Price.	No.	Object-glass.	Price.	No.	Object-glass.	Price.
		$ c.			$ c.			$ c.
87.	3-inch,	5 75	89.	1½-inch,	5 75	91.	$\frac{4}{10}$-inch,	4 00
88.	2-inch,	5 75	90.	⅔-inch,	4 20	92.	¼-inch,	4 00

APPARATUS.

No.		Price.
66.	Sorby's Spectroscope Eyepieces, for the Microscope, in Mahogany Case. (See "Popular Science Review," No. 18),	$45 00
67.	Sorby's Dichroiscope,	8 25
67*.	Sorby's Standard Spectrum-scale,	8 25
96.	Orthoscopic Eyepieces, giving a very large field, each,	8 25
97.	Eyepieces for the Improved Large Microscope, each,	6 50
98.	Eyepieces for the Improved Smaller Microscope, each,	6 00
99.	Erecting-glass,	8 00
100.	Draw-tube for First-Class Microscopes,	4 00
101.	Achromatic Condenser, with Revolving Diaphragm, with stops, aperture from 25° to 80°, complete adjustments, applicable to the First-Class Stands only,	40 00
102.	Achromatic Condenser, without Diaphragm, Aperture from 20° to 60°, complete Adjustments,	20 00
104.	Right-angle Prism, for reflecting the light more perfectly than the Flat Mirror, for the First-Class Stands only,	20 00
105.	Amici's Prism, for oblique light, for the First-Class Stands only,	16 50
106.	Amici's Prism, on Separate Stand,	16 50
107.	Nachet's Prism, for oblique light,	8 25
108.	Wenham's Parabolic Reflector, for the First-Class Stands,	13 50
109.	Wenham's Parabolic Reflector, for the Second-Class Stands,	13 50
110.	Spot Lens, mounted in brass fitting,	4 25
111.	Equilateral Prism on Stand, for oblique illumination,	8 00
112.	Adapter on Stand, for use of Object-glass as Condenser,	4 50
113.	Brown's Iris Diaphragm,	16 50
115.	Polarizing Apparatus, with 1 Film of Selenite,	20 00
116.	Polarizing Apparatus, with extra-large Polarizing Prism,	32 50
117.	Darker's Series of Selenites, adapted for the First-Class Stands only,	30 00
118.	Selenite Film, of two colors,	2 00
119.	Selenite Stage, Red and Green or Blue and Orange, each,	3 00
120.	Darker's Selenite Stage, giving 13 tints,	16 50
121.	Black Glass, for Polarizing Light,	4 00
122.	Bundle of Glass, for Polarizing Light,	8 00
123.	Two Double-Image Prisms and Selenite Film, with fittings to Eye-piece, and brass plate with holes,	16 50
123*.	Single Double-Image Prisms, in fitting,	7 25
124.	Crystals to show rings round the Optic Axis, each from,	4 00
125.	Tourmalines, each from,	7 00
126.	Beck's Patent Illuminator, in a brass box, for viewing Objects as Opaque under high powers,	4 00
127.	White-cloud Illuminator,	4 00
128.	Parabolic Illuminator, fitted to the 1½-inch and ⅔-inch Object-glasses,	8 25
128*.	Parabolic Illuminator with fittings adjusting it to any object-glass,	10 00
129.	Parabolic Illuminator, same as No. 128, with the addition of Sorby's Reflector,	16 00
130.	Large Bull's-eye Condensing Lens, on stand,	8 00
130*.	Large Bull's-eye Condensing Lens, on Stand, with Lamp attached,	10 00
131.	Smaller Condensing Lens, with Fitting to Limb of the First-Class Stands,	7 25
132.	Smaller Condensing Lens, on Stand,	5 00
133.	Side Silver Reflector, with Fittings to Limb of the First-Class Stands,	8 25
134.	Side Silver Reflector, on Stand,	8 25

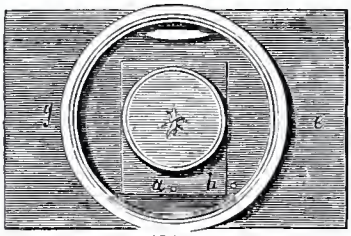
MICROSCOPE ACCESSORIES.

67.

136.

113.

129.



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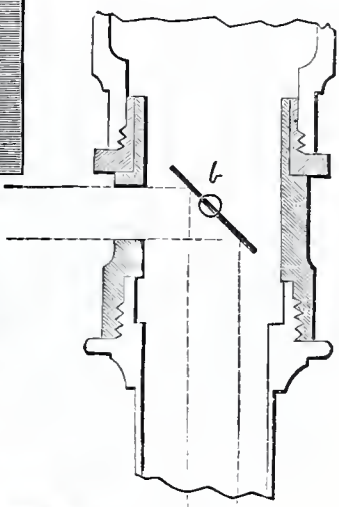

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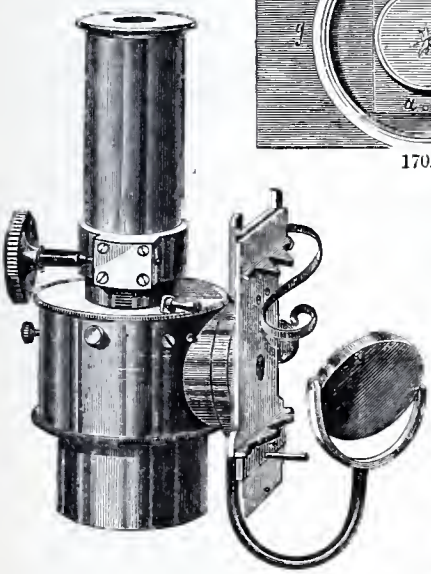

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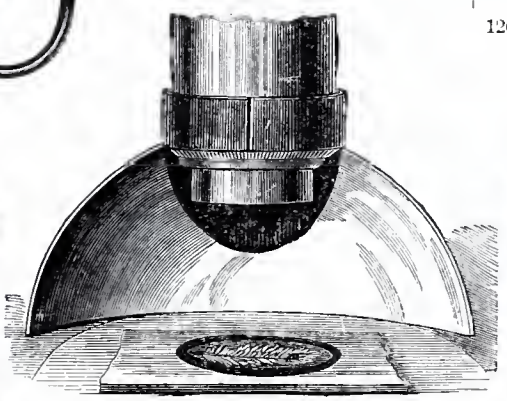

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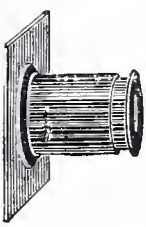
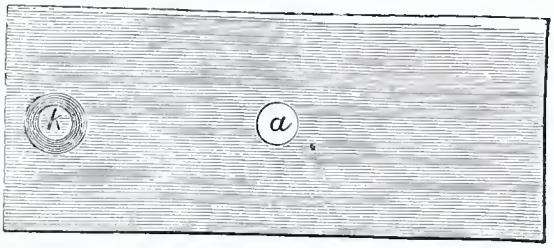


67.*

MICROSCOPE ACCESSORIES.



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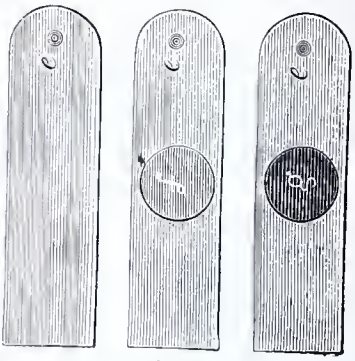

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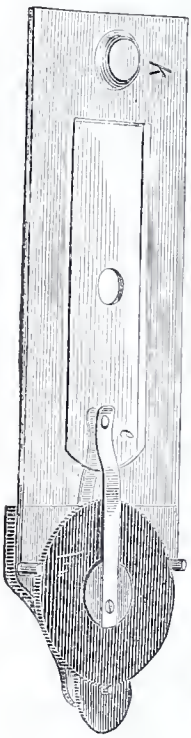

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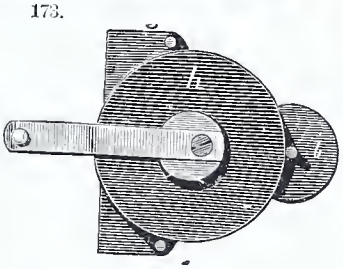

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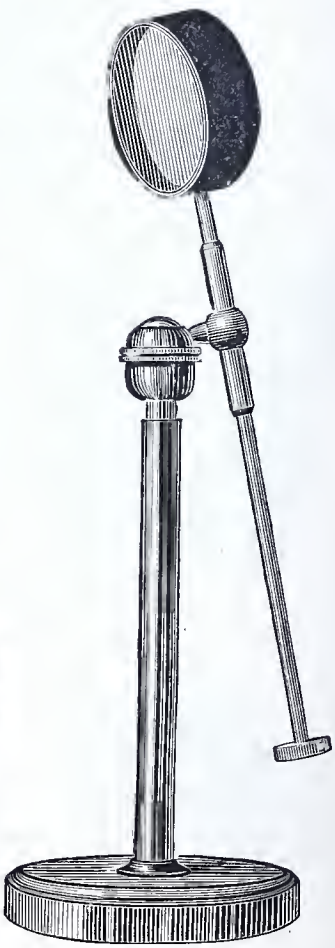


135.

No.		Price.
135.	Rainey's Light Moderator, on Stand,	$8 25
136.	Three Dark Wells and Holder,	5 00
137.	Opaque-Disk Revolver, one Tray of Disks in case,	13 50
138.	Opaque Disk Revolver, with 3 trays of Disks, Forceps, Capsule of Gold Size, in Mahogany Case, complete,	23 50
139.	Opaque-Disk Revolver, and Forceps,	8 00
140.	Boxes containing 24 Disks,	4 00
141.	Trays containing 24 Disks,	4 00
142.	Three-pronged Forceps, in German Silver, with Screw Adjustment.	6 50
143.	Three-pronged Forceps,	5 50
144.	Stage Forceps,	3 00
145.	Stage Mineral-holder,	8 25
146.	Eyepiece Micrometer, with Jackson's Adjusting Screw,	8 00
147.	Stage Micrometer, mounted in brass,	4 00
148.	Stage Micrometer, mounted in card,	2 00
150.	Maltwood's Finder in case,	3 00
152.	Indicator to each Eyepiece,	2 00
154.	Leeson's Goniometer,	20 00
155.	Wollaston's Camera Lucida, with lens to magnify Pencil Point,	8 00
156.	Neutral-tint Glass Camera Lucida	3 00
157.	Steel-disk Camera Lucida,	6 00
158.	Brook's Double Nosepiece, in Aluminium, curved,	23 50
159.	Brook's Double Nosepiece, curved,	11 75
160.	Quadruple Nosepiece,	27 50
161.	Quadruple Nosepiece, in Aluminium,	40 00
162.	Lever Compressorium,	7 50
163.	Parallel Compressor,	8 00
164.	Reversible Compressor,	8 00
165.	Wenham's Compressorium, for use with Wenham's Parabola,	3 00
166.	Screw Live Box,	5 50
167.	Large Live Box,	3 25
168.	Smaller Live Box,	2 75
169.	Large Glass Trough, with Wedge and Spring complete,	3 25
170.	Smaller Glass Trough, with Wedge and Spring complete,	2 75
171.	Glass Slip, with Ledge,	40
172.	Growing-cell, for preserving objects alive in water for many days,	4 00
173.	Set of Six Live Traps and Trough, in Case, complete,	11 75
174.	Live Trap,	3 00
175.	Frog-plate, with Bag, &c., complete,	4 00
176.	Glass Slip, with Hollow and Ledge,	50
177.	Glass Slip, with Hollow and Ledge and Lip,	1 75
180.	Glass Tubes, Set of Three,	75
181.	Key for Tightening Joint of First-class Instruments,	1 75
182.	Opal Glass, for Moderating the Light, 3 x 1 inch,	40
183.	Blue Glass, for Moderating the Light, 3 x 1 inch,	40
186.	Astral Oil Lamp, Flat Wick and Shade, with arrangement for varying height of flame above the table,	6 00
186.*	Case for Lamp, No. 186, and 1 chimney,	4 00
188.	Gas Lamp, Argand Burner, Shade and six feet of flexible tubing, with arrangement for varying height of flame above the table,	12 00
189.	Fiddian's Microscope Illuminator, in case,	15 00
190.	Lamp Chimneys, for Nos. 186 or 188,	20
192.	Gallon Can of Astral Oil,	75

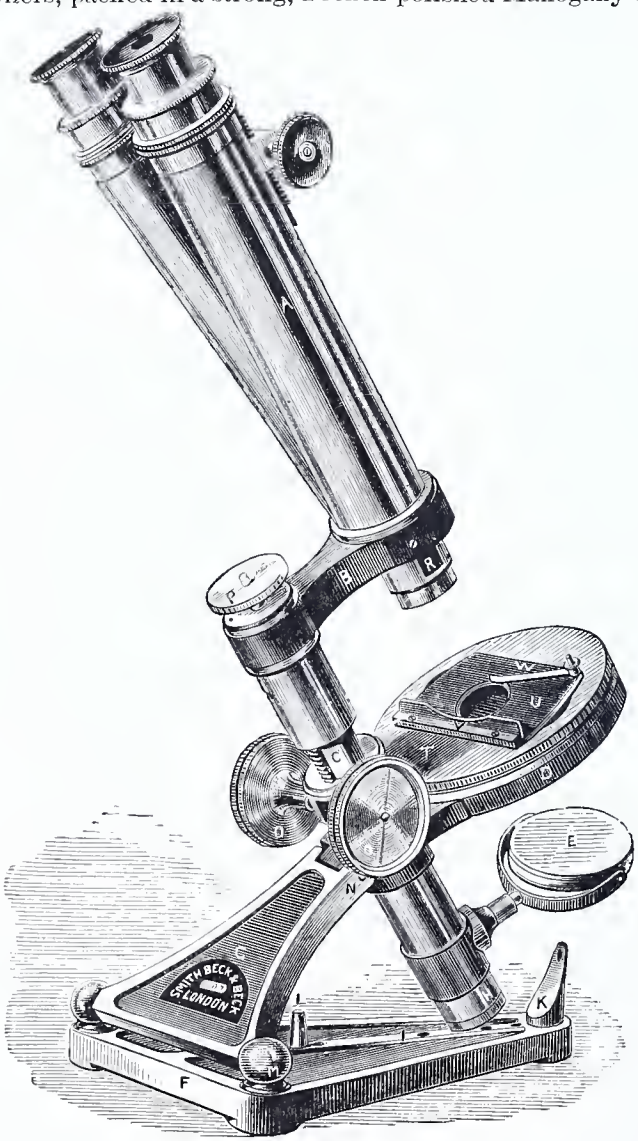
Any piece of apparatus in the foregoing list can be applied to the *first-class* Stands of all makers, American or English, and the prices will be found much *lower than those of any other first-class manufacturers.*

THE POPULAR MICROSCOPE.

No. PRICE.

220. ***The Binocular Popular Microscope.*** $115 00

With 2-inch, 1-inch, and $\frac{1}{4}$-inch Object-glasses, having the respective apertures of 10, 22, and 75 degrees, and 2 pairs of Eyepieces; a new improved Stand with arrangment for varying the position, quick and slow motions to the body; Stage with improved object-holder and concentric revolving fitting; Concave mirror with complete adjustments; a Side Condensing Lens on stand; Diaphragm, with perforated revolving disk; improved Forceps; Glass plate, and a pair of pliers, packed in a strong, French-polished Mahogany Case,



No. 223.

with brass hooks, a good lock and strong handle, together with two Trays provided with necessary fittings for the complete series of Object-glasses and Apparatus. *See page* 20.

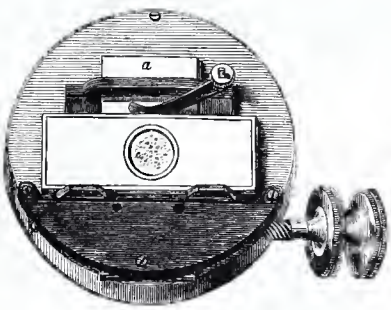
No. PRICE.

221 ***The Binocular Popular Microscope.*** $80 00

With 2-inch Object-glass; one pair of Eyepieces; Concave Mirror; Side Condensing Lens on Stand; Diaphragm; Forceps; Glass Plate, Pliers, &c., in Mahogany Case.

222. ***The Monocular Popular Microscope.*** 80 00

With 1-inch and ¼-inch Object-glasses; 2 Eyepieces; Concave Mirror; Side Condensing Lens on Stand; Diaphragm; Forceps; Glass Plate, Pliers, &c., in Mahogany Case.



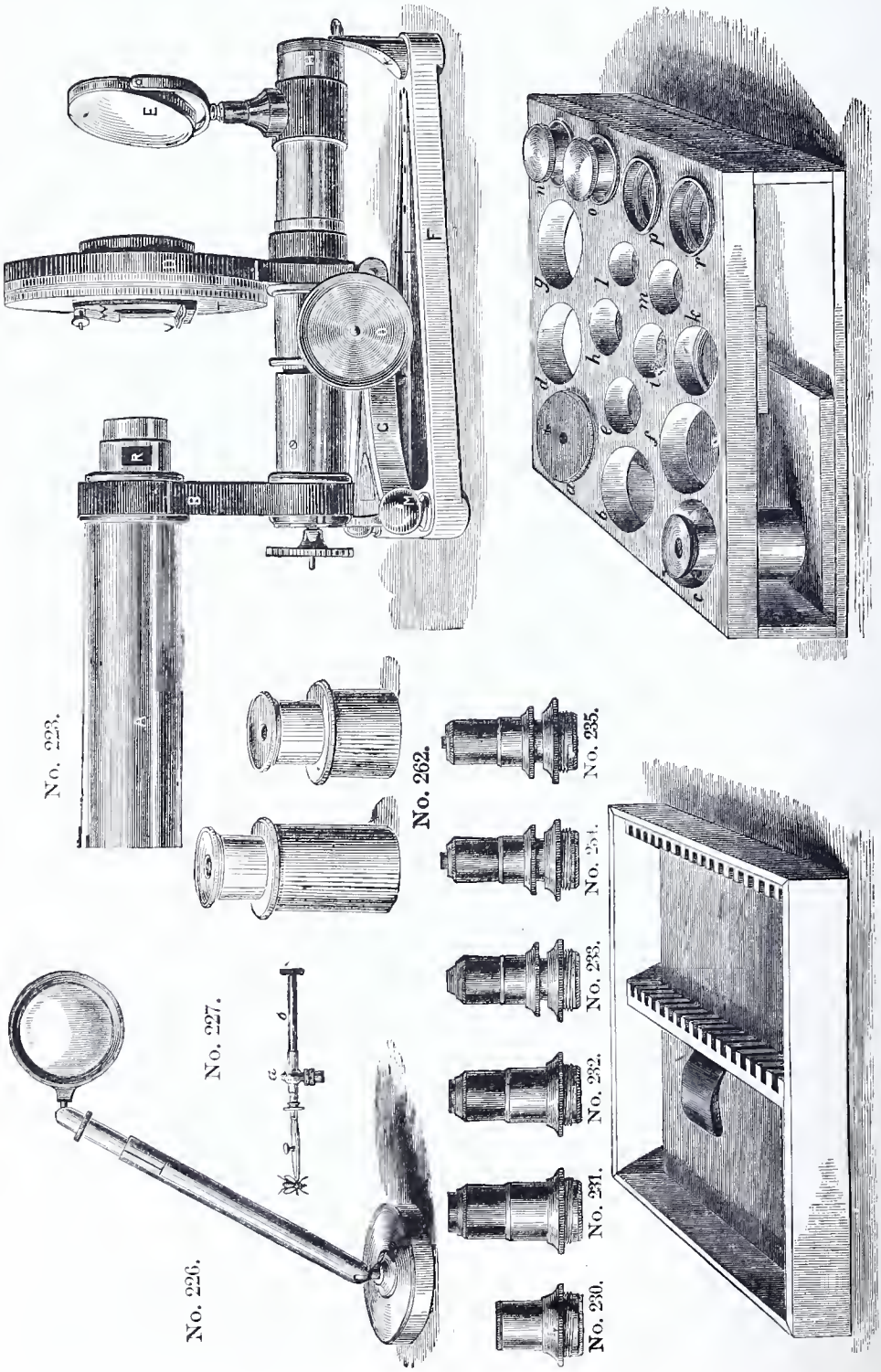
No. 251.

No. 223.

223 The Binocular Popular Microscope Stand, with one pair of Eyepieces; Concave Mirror; Diaphragm; Forceps; Glass Plate, Pliers, &c., . $65 00

224. The Monocular Popular Microscope Stand, with One Eyepiece; Concave Mirror; Diaphragm; Forceps; Glass Plate, Pliers, &c., . . 40 00

THE POPULAR MICROSCOPE.



No.		Price.
225.	Mahogany Case for Popular Microscope,	$6 50
226.	Side Condensing Lens, on Stand,	3 00
227.	Improved Stage Forceps,	2 00

PRICE LIST OF OBJECT-GLASSES AND LIEBERKUHNS.

No.	Focal length.	Linear magnifying power nearly, with eyepieces,		Degrees of angle of aperture.	Price.	No.	Object-glass.	Price.
		Draw-tubes	No. 1.	No. 2.				
					$ c.			$ c.
229.	3 in.	closed	12	20	8	13 00		
230.	2 in.	closed	24	40	10	12 00		
231.	1½ in.	closed	29	48	15	15 00	237.	1½ in. 3 75
232.	1 in.	closed	55	90	22	15 00	238.	1 in. 3 00
233.	½ in.	closed	120	200	40	17 50	239.	½ in. 3 00
234.	¼ in.	closed	210	350	75	20 00		
235.	⅛ in.	closed	420	700	85	30 00		
236.	$\frac{1}{20}$ in.	closed	800	1200	100	50 00		

ADDITIONAL APPARATUS.

238.	Lieberkuhn to 1-inch Object-glass,	$ 3 00
240.	Dark Well,	1 75
241.	Achromatic Condenser and Fitting,	8 00
242.	Wenham's Parabolic Reflector, for Dark-field Illumination,	8 00
243.	Flat Mirror, (in which case a double one is substituted for the concave single one, which has to be returned),	3 00
244.	Polarizing Apparatus, complete, with Prisms, Plate of Selenite and Adapter,	13 50
245.	Wollaston's Camera Lucida, for drawing an object,	6 00
246.	Glass Micrometer, ruled into $\frac{1}{100}$ths and $\frac{1}{1000}$ths of an inch,	2 00
247.	Small Live Box,	2 00
248.	Glass Trough, complete with Wedge and Spring,	2 50
250.	All the above Additional Apparatus, from Nos. 238–248, if ordered at once,	40 00
251.	Stage, with horizontal and Vertical Mechanical Movements, Sliding Object-holder, and Revolving Fitting, complete,	20 00
252.	Glass Stage with Ivory Points moving on Glass, giving a very delicate adjustment,	10 00
253.	Double Nosepiece, angular,	6 00
253.*	Triple Nosepiece,	10 00
254.	Series of Two Dozen Popular objects in Case,	8 00
255.	Series of Six Dozen Educational objects in Mahogany Case,	30 00
262.	Eyepieces for the Popular Microscope, each,	5 00

All the above apparatus is applicable to the New National Microscopes, Nos. 275 and 276, without further fitting.

THE ECONOMIC MICROSCOPE.

The Microscope is now such an absolute necessity for the student, to enable him satisfactorily to carry on his investigations, that it is more than ever incumbent on the optician to construct a sound economic instrument, adapted to the special requirements of this large and increasing class.

For ordinary pathological, physiological, and botanical investigations, many of the delicate adjuncts applied to the higher-priced instruments are unnecessary, and tend rather to confuse than to assist the beginner.

A firm Stand and well-corrected Object-glasses are, however, indispensable; and, with a view to meet this want, we have constructed and now introduce to the special attention of professors and students, the "ECONOMIC MICROSCOPE."

The description following will fully explain both the construction and the mode of using this instrument; whilst the scale of prices at the conclusion will, we trust, convince all who peruse them that we are able, by means of the machinery at our command, to offer those who do not desire to spend a large sum on a microscope, an instrument thoroughly adapted to their necessities, at a very moderate outlay.

A *Compound Achromatic Microscope*, consists essentially of two parts,—an *Object-glass* and an *Eyepiece*,—so called because they are respectively near the object and the eye when the instrument is in use. The object-glass screws, and the eyepiece slides, into opposite ends of a tube termed the *Body*, and upon the union of the two the magnifying power depends. The *Microscope Stand* is an arrangement for carrying the body, and is combined with a *Stage* for holding or giving traverse to an object, and a *Mirror* or some other provision for illumination.

The *Stand* of the ECONOMIC MICROSCOPE is made in two forms—the one with a *sliding coarse adjustment* for focussing the object, and the other where the *quick movement* is produced by a rack and pinion. On both stands the fine adjustment is given by means of a milled head at the top of the stem. The Object-glasses are attached to the stand with the Universal or Society Screw.

DESCRIPTION OF THE STAND (Fig. 1, No. 263) AND APPARATUS AS SUPPLIED FOR $35 00.

The foundation of the stand (Fig. 1, No. 263) is a heavy horse-shoe base, A, at the bend of which is a firm pillar, B, having at its top a hinge joint, C, which allows the body, D, to be inclined at any angle, and is sufficiently firm to permit of its being placed horizontal for use with the Camera Lucida.

At this price the instrument includes one *Eye-piece*, and two *Object-glasses*, called the 1-inch and $\frac{1}{4}$ inch, from their magnifying power being nearly the same as single lenses of such focal lengths, a condensing lens for the illumination of opaque objects, a glass plate with ledge, for examination of fluids, and a pair of brass pliers. The whole packed in a neat Mahogany case, with lock and key.

Its *Linear Magnifying-powers* are nearly as under:—

	Draw-tube closed.	Draw-tube pulled out.
1-inch.....	45	75
$\frac{1}{4}$-inch.....	155	240

The Body is supplied with a draw- or lengthening-tube, V, which must be pulled out to give the full power to the object-glass, F.

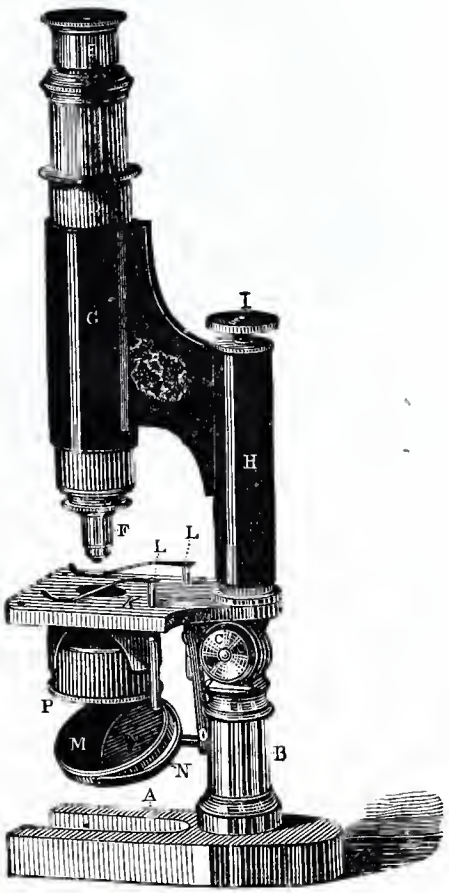
The *Quick-focussing movement* is produced by sliding the body, D, up and down in the tube, G, and the *slow motion* is given by the tube, H, sliding over the inner stem with a spring inside, and adjusted by the milled head, I.

The *Stage*, K, upon which the object is placed, has two springs, L, L, the pins attached to which may be inserted in any of the four holes on the stage, and by their pressure, (which can be varied by pushing them more or less down) they will hold the object under them or allow it to be moved about with the greatest accuracy.

The *Mirror*, M, besides swinging in the rotating semicircle, N, is attached to a bar, O, with a joint at each end allowing a lateral movement, so as to throw oblique light on the object; and for this purpose the tube beneath the stage, carrying the Diaphragm has semi-circular openings cut on either side, leaving a clear and very thin stage, allowing the utmost obliquity of illumination. This tube also carries the Polariscope, etc., etc.

The *Diaphragm*, P, slides in the substage-fitting, and consists of a tube containing two caps furnishing two sizes of openings, immediately in contact with the under surface of the slide to be examined, and also completely cutting off all light from the Mirror when opaque objects are to be viewed.

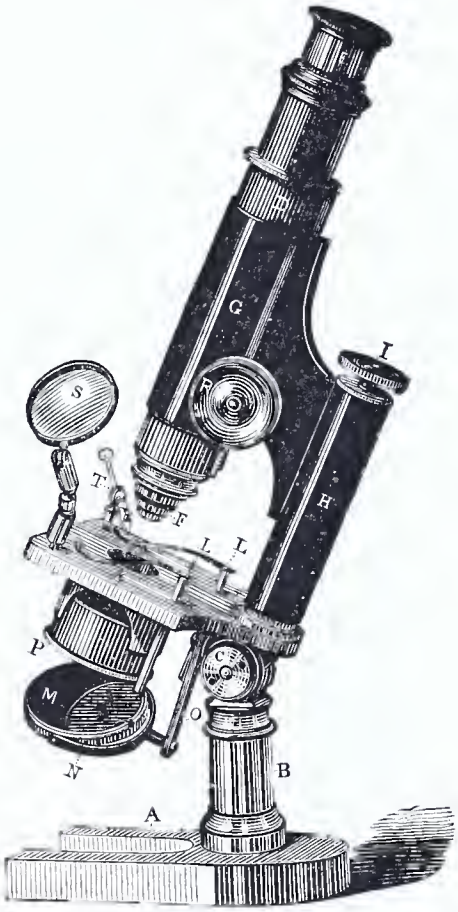
Fig. 1.



No. 263.

With the exception of the substitution of a *Rackwork coarse adjustment* for the sliding movement by hand the addition of a plane Mirror, larger Eye-pieces, and removable tube beneath stage carrying Diaphragm, etc., the *Stand* (Fig. 2, No. 264) in no way differs from that described as Fig. 1.

Fig. 2.



No. 264.

DESCRIPTION OF THE STAND (FIG. 2, NO. 264) AND APPARATUS AS SUPPLIED FOR $50.00.

The *Coarse Adjustment*, R, is produced by a rack and pinion conveniently placed, which moves the body-tube, D, carrying the object-glass, F, and eye-piece, E, up and down with greater precision.

For the above-named sum the Instrument is supplied with *two Eye-pieces* and *two Object-glasses*, as described below:—

	Draw-tube closed.		Draw-tube pulled out.	
	No. 2 Eye-piece.	No. 3 Eye-piece.	No. 2 Eye-piece.	No. 3 Eye-piece.
1-inch.....	60	100	110	200
¼-inch.....	220	330	330	450

A *Side Condensing-Lens* (S) for the illumination of opaque objects, fitting into any of the holes on the stage, K, and supplied with a universal joint for placing it in any position.

A *pair of Forceps*, T, for holding a minute object, also fitting into the holes on the stage, K.

A *pair of Brass Pliers* for use in water.

A *glass plate with a ledge* specially intended for the examination of fluids, and a few pieces of *thin glass* for covering the object under observation.

The Stage, K, the Diaphragm, P, and the Case are exactly the same as these described under Fig. 1.

DIRECTIONS FOR USE.

To adjust the focus of the Object-glass—

In Fig. 1, for the quick adjustment, slide the tube, D, up or down in the fitting, G. If a slight *spiral movement* is given to the tube by the finger and thumb, the motion may be made very gradual.

In Fig. 2 the same adjustment is made by turning the milled head, R, backward or forward.

In both, turning the milled head, I, gives the slow or fine adjustment.

The *light* (which for transparent objects is reflected from the mirror, M, and for opaque objects is condensed by means of the lens, S) should, in general, be upon the left of the observer if the microscope-body is inclined, but in front if the Instrument is used in a vertical position. The best is that from a white cloud on a bright day; but a very satisfactory effect can be produced by means of a petroleum-oil, or gas-lamp, provided it is placed not more than 10 or 12 inches from the Instrument.

For the examination of minute striæ, *side-light* is necessary; for this purpose the mirror, M, must be used obliquely, the diaphragm, P, with its fitting removed, which will then allow the light to impinge on the object at a sufficiently *oblique* angle.

With the 1-inch Object-glass the light is generally in excess, and has to be lessened by means of the diaghragm, P, fitting under the stage; this can be slid up and down, thereby increasing or decreasing the cone of admitted rays of light.

To illuminate *opaque objects* the light is thrown upon them from above. A small condensing-lens, S, fitting into the stage, K, is used for this purpose; its focus for a lamp or candle 4 inches from it, is about 3 inches; for daylight 2 inches. A large object can be placed upon the stage, but small ones are generally either laid on a slip of glass or held in the forceps, T. When viewing opaque objects, the diaphragm, P, should be placed in position and the solid cap attached, so as to exclude all light from below the stage.

A glass plate, with a ledge and some pieces of thin glass, are applicable for many purposes, but are specially intended for *objects in fluid*. Thus a drop is placed upon the plate and covered by a piece of thin glass, or, the object being put upon the plate and the thin glass over it, the fluid is applied near one side and runs under by capillary attraction.

Glass of any kind requires occasional *cleaning;* a piece of soft wash-leather is the best for the purpose.

The fronts of the *Object-glasses* may be carefully wiped; but if they require anything more, it must be done by the makers.

When cleaning the *Eye-pieces*, which should be done *frequently*, the cells containing the glasses must be unscrewed, and replaced one at a time, so that they may not be mixed.

Any dirt upon the *Eye-pieces* may be detected by turning them round whilst looking through the Instrument; but if the *Object-glasses* are not clean, or are injured, it will for the most part only be seen by the object appearing misty.

The whole or any part of the extra apparatus described in the following pages may be added to the instrument at any time, without its being sent back to the makers.

ADDITIONAL APPARATUS.

Although the Instrument, as already described, may be considered complete and probably sufficient for many observers, yet the following additions can be made, all of which, packed in a small tray, will fit into the case which contains the Microscope:

When the light from the concave mirror proves insufficient for any object requiring an intense transmitted light, the *Achromatic Condenser* (No. 241, Fig. 3) may be employed with advantage: this slides, by its tube, into the fitting under the stage of the Instrument, in which it has to be moved up or down until the focus of its lenses falls upon the object, the light having been previously reflected in the proper direction by the mirror.

Fig. 3.
241.

Fig. 4.
238*.

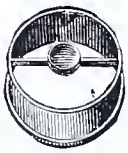


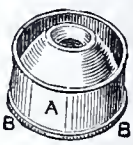
Fig. 5.
240.

The *Illumination of Opaque Objects*, already described, must be more or less one-sided; and in most cases it is desirable that it should be so. An illumination on any or every side, however, is easily obtained, provided the object is not too large, by means of the *Lieberkuhn* (No. 238*, Fig. 4). This is a silvered cup, which slides or screws upon the front of the object-glass; and light thrown upwards by the mirror will be reflected by it down upon the object; it will then be found that, by slightly varying the inclination of the mirror, every necessary alteration in the direction of the illumination can be obtained. The *Lieberkuhn* here shown is intended for the 1-inch object-glass.

It is in most cases necessary, when using the Lieberkuhn, to slide a *Dark Well* (No. 240, Fig. 5) under the stage to prevent any light entering the Object-glass direct from the Mirror.

Dark-Field Illumination is, to appearance, a means of seeing a transparent object as an opaque one. The principle, however, is that all the light shall be thrown under the object, but so obliquely that it cannot enter the Object-glass unless interrupted by the object; this is best accomplished by *Wenham's Parabolic Reflector* (No. 242, Fig. 7).

Fig. 7.

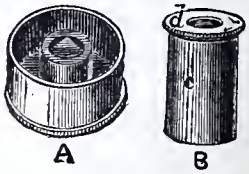


No. 242.

In this Microscope, the *Parabolic Reflector* fits under the stage in the same fitting as the achromatic condenser, and the adjustment of its focus upon the object (which is when its apex almost touches it) is made by giving it a spiral motion in the fitting—that is, carefully pushing it up or down at the same time that it is turned round by the milled edge, B B. As the rays of light must be parallel when they enter it, a *Flat Mirror* (No. 243*), which in this case should be added to the instrument, is generally used; daylight will then require only direct reflection, but the rays from an artificial source will have to be made parallel by putting the Condenser (No. 266) between the light and the mirror, about $1\frac{3}{4}$ inches from the former, and $4\frac{1}{2}$ inches from the latter. Nearly the whole surface of the the mirror should be equally illuminated, which may be tested by temporarily placing upon it a card or piece of white paper. Parallel rays can also be obtained from the *concave Mirror*, if the light is put about $2\frac{1}{2}$ inches from it.

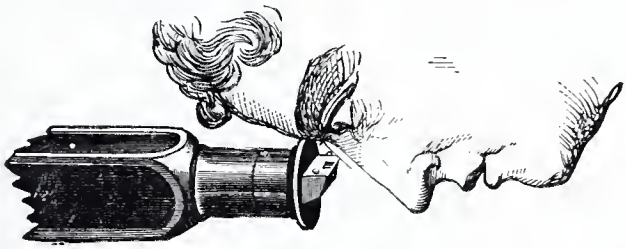
Fig. 8.

Polarized Light, invaluable to some microscopists, and to others a beautiful appliance by which many objects otherwise almost invisible are shown in every imaginable color, can here only be treated of by describing the way in which it is applied to this Microscope by the following apparatus (No. 244, Fig.8): A Nicol's prism as a polarizer, A, fits, and can be turned round, in the fitting under the stage; another prism, B, slides in the place of the cap of either Eye-piece, and also revolves. When only alternate black and white images are given by the prisms alone, a plate of selenite, G, will produce colored ones.



No. 244.

To draw an object, the *Camera Lucida* (No. 245,) is used. It slides on in the place of the cap of either Eye-piece, with its flat side uppermost, as shown. The body of the Microscope must be in a horizontal position, and the whole instrument has to be raised until the edge of the prism is exactly 10 inches from a piece of paper placed upon the table. The light must be so regulated that no more than is really necessary is upon the object, whilst a full light should be thrown upon the paper. Only one eye is to be used; and if one-half of the pupil be directed over the edge of the prism, the object will appear upon the paper, and can be traced on it by a pencil, the point of which will also be seen. Should any blueness be visible in the field the prism is pushed too far on, and should be drawn back till the color disappears.



Substituting in the place of the object a piece of glass ruled into 100ths and 1000ths of an inch, termed a *Micrometer* (No. 246, Fig. 10), its divisions can be marked on the same or another piece of paper, and, by comparing them with the sketch, the object can be most accurately measured. These divisions, also, if compared with a rule divided into inches and tenths, will give the magnifying power: thus, supposing $\frac{1}{100}$ths of an inch when marked on the paper measured 1 inch and $\frac{3}{10}$, the magnifying power would be 130.

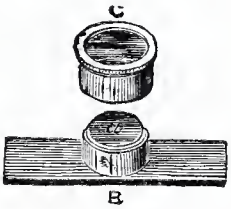
The *Live-box* (No. 247, Fig. 11) hardly needs description; the object is confined between the glass, *a*, of the lower part, B, and that of the cap C; the distance between them can be varied by sliding the latter more or less on. As the thin glass is only dropped into a slight recess in the top of the cap, and is held there by the heads of the two screws, it can be easily taken out for wiping, or be replaced by another when broken.

The *Glass Trough* (No. 248, Fig. 12), for larger objects in water, must be used with its thinner plate of glass, *b*, in front. The modes of confining such objects,

Fig. 10.

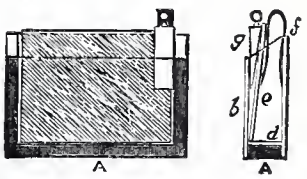
No. 246.

Fig. 11.



No. 247.

Fig. 12.



No. 248.

and keeping them near the front surface, must vary according to the occasion. For many it is a good plan to place a piece of glass, *e*, diagonally in the trough, its lower edge being kept in its place by a strip (*d*) at the bottom; then if the object introduced is heavier than water, it will sink till stopped by the sloping plate. Sometimes a very slight spring (*f*) may be applied behind this plate to advantage, with a wedge (*g*) in front to regulate the depth.

Arrangements are made for all those parts which may require cleaning. Thus, the Parbolic Reflector unscrews from the tube; the Nicol's Prisms will push out of their fittings; and the Camera-Lucida Prism can be taken out by turning aside the plate that covers it.

PRICES OF THE ECONOMIC MICROSCOPE AND APPARATUS.

No.		Price.
263.	The Economic Microscope, with sliding coarse adjustment, 1 inch and ¼-inch Object-glasses, one Eye-piece, Concave Mirror, condensing lens, glass plate with ledge, brass pliers and Diaphragm, in Mahogany Case,	$35 00
264.	The Economic Microscope, with Rack-and-pinion coarse adjustment, with 1-inch and ¼-inch Object-glasses, two Eye-pieces, Concave and Plane Mirrors, side Condensing-Lens, Diaphragm, Stage-Forceps, Pliers, Glass slip, with ledge, in Mahogany Case,	50 00
265.	Extra Eye-Pieces,	4 00
266.	Side Condensing-Lens,	1 75
267.	Stage-Forceps,	2 00
268.	Pliers,	35

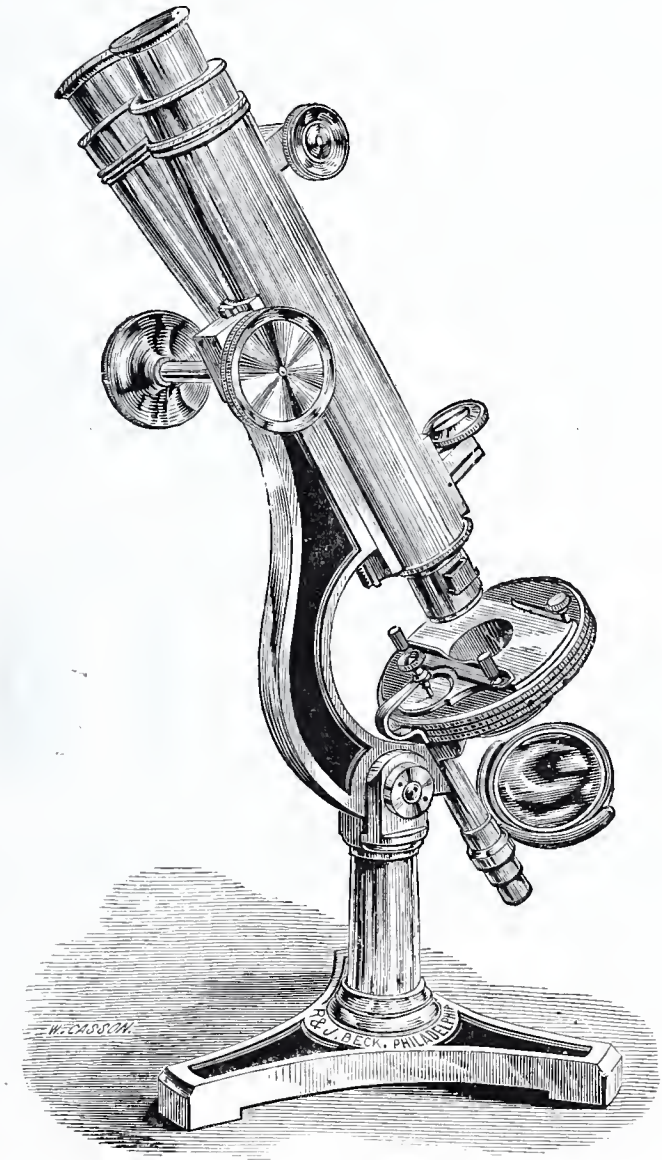
ADDITIONAL APPARATUS.

238*.	Lieberkuhn to 1-inch Object-Glass,	3 00
240.	Dark Well,	1 75
241.	Achromatic Condenser and Fitting,	8 00
242.	Wenham's Parabolic Reflector, for Dark-field Illumination,	8 00
243*.	Flat Mirror (in which case a double one is substituted for the concave single one, which has to be returned),	2 75
244*.	Polarizing Apparatus, complete with Prisms, Plate of Selenite, Adapter,	12 00
245.	Wollaston's Camera Lucida, for drawing an object,	6 00
246.	Glass Micrometer, ruled into $\frac{1}{100}$ths and $\frac{1}{1000}$ths of an inch,	2 00
247.	Small Live-Box,	2 00
248.	Glass Trough, complete with Wedge and Spring,	2 50
249.	All the above "Additional Apparatus," No. 238*–248, if ordered at once,	37 50

PRICES OF OBJECT-GLASSES.

No.	Focal Length.	Linear magnifying power with, eye-pieces, nearly.....	No. 1.	No. 2.	Price.
269.	2 inches	Draw-tube closed.....	20	30	$6 00
		Draw-tube pulled out.....	35	50	
270.	1 inch	Draw-tube closed.	45	60	7 00
		Draw-tube pulled out.....	75	110	
271.	½ inch	Draw-tube closed.....	90	125	9 00
		Draw-tube pulled out.....	155	200	
272.	¼ inch	Draw-tube closed.....	155	240	10 00
		Draw-tube pulled out.....	210	330	
273.	⅛ inch	Draw-tube closed.....	300	450	17 00
		Draw-tube pulled out.....	500	700	
274.	$\frac{1}{20}$ inch	Draw-tube closed....	630	1150	35 00
		Draw-tube pulled out.....	810	1330	

THE NEW NATIONAL MICROSCOPE.



No. 275.

275. ***The New Binocular National Microscope,*** $100 00

The Stand is 14 inches in height, all brass, with Tripod Base. The arm carrying the body is supported upon an upright Solid Column, with joint allowing of inclination at any angle from vertical to horizontal, the whole being perfectly steady in any position. The quick Adjustment of Focus is effected by means of a Rack and Pinion with large Milled Heads, of the most perfect construction; the fine Adjustment by a delicate Micrometer Screw. The Stage is of Glass,

ample in size, either rotating Concentrically or of the Plain form as may be desired; beneath is a Tube carrying all substage illuminating apparatus, and which is entirely removable to allow of Oblique Illumination. The Diaphragm is of entirely novel construction with various sized openings, directly beneath the object. Concave and Plane Mirrors are hung upon a swinging bar with complete adjustments, allowing them to be placed in every possible position. Two Object-glasses 1 inch and $\frac{1}{4}$ inch, magnifying from about 55 to 450 diameters, two pairs of Eye-pieces, Stage Forceps, Glass Plate, Condensing Lens on separate Stand, and a pair of Pliers; packed in a strong French polished Mahogany Case, with good brass handle and lock, and drawer for accessories.

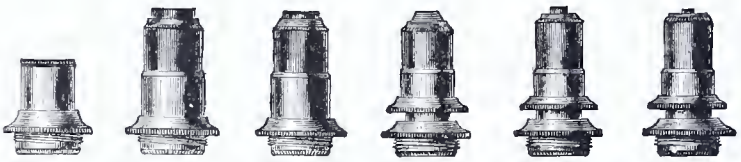
276. ***The New Monocular National Microscope,*** $75 00
With Two Eye-pieces, and the same Object-glasses and fittings as No. 275. In Mahogany Case.

277. ***The New Binocular National Microscope Stand,*** $65 00
With one pair of Eye-pieces, Concave and Plane Mirrors, Diaphragm, Stage Forceps, Glass Plate, Pliers, etc.

278. ***The New Monocular National Microscope Stand,*** $40 00
With one Eye-piece, Concave and Plane Mirrors, Diaphragm, Stage Forceps, Glass Plate, Pliers, etc.

279. Mahogany Cabinet for The New National Microscopes, ... $10 00

NEW NATIONAL SERIES OF OBJECTIVES.



No. 293. No. 294. No. 295. No. 297. No. 298. No. 299.

In order to meet the universal demand for good and well corrected Object-glasses, adapted to the wants of true observers, who need reliable glasses at a moderate cost, impossible in lenses of the very highest grade, we have now introduced our ***New National Series,*** which we confidently recommend as the best low-priced Objectives ever made. They are corrected with great care, are exceedingly well mounted, furnished with the Society Screw, and packed in handsome engraved Brass Boxes. The Series is as follows:

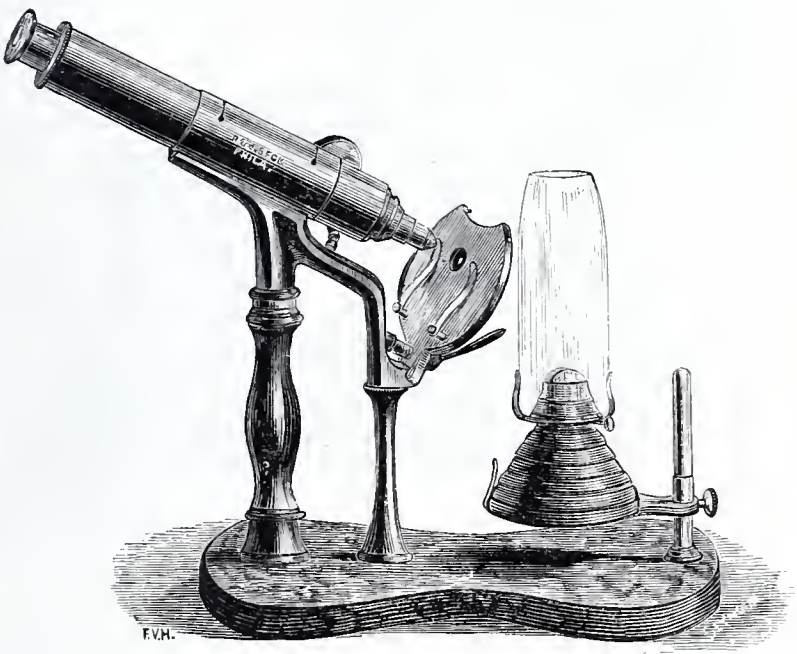
No.		Price.
293.	3 inch	$6 00
294.	2 "	6 00
295.	1 "	8 00
296.	$\frac{3}{4}$ "	9 00
297.	$\frac{1}{2}$ "	10 00
298.	$\frac{1}{4}$ "	12 00
299.	$\frac{1}{8}$ "	20 00

ADDITIONAL APPARATUS.

238. Lieberkuhn to 1-inch Object-glass, ... $3 00
240. Dark Well, ... 1 75
241. Achromatic Condenser and Fitting, ... 8 00
242. Wenham's Parabolic Reflector, for Dark-field Illumination, . . 8 00

No.		Price.
244.	Polarizing Apparatus, complete with Prisms, Plate of Selenite and Adapter,	$13 50
245.	Wollaston's Camera Lucida, for drawing an object,	6 00
246.	Glass Micrometer, ruled into $\frac{1}{100}$ths and $\frac{1}{1000}$ths of an inch,	2 00
247.	Small Live-Box,	2 00
248.	Glass Trough, complete with Wedge and Spring,	2 50
250*.	All the above Additional Apparatus, from Nos. 238-248, if ordered at once.	37 50
253.	Double Nose Piece, Angular,	6 00
262.	Eye-pieces, for New National Microscopes,	5 00

HOLMES'S LECTURE ROOM MICROSCOPE.



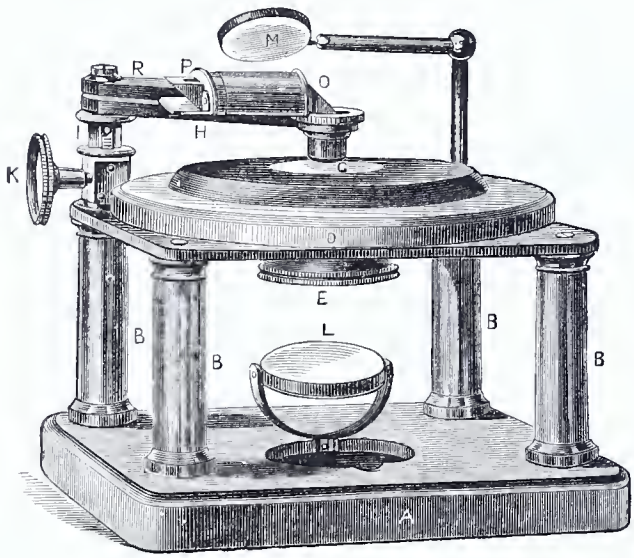
No. 305.

305. ***Holmes's Lecture Room Microscope,*** $20 00

The "Holmes's Lecture Room Microscope" was originally designed by Dr. O. W. Holmes, of Boston, for use in his own class. By slight modifications of his original plan, we have succeeded in producing the instrument in a somewhat improved form, and feel assured it exactly fills a long-felt want, combining as it does a *perfect Class* microscope, with a very excellent and practical stand for all ordinary table use. Supported on a base of polished walnut by a column of the same wood (which forms the handle for class use), is a light frame of brass, bearing upon its upper surface, at an angle most convenient for observation, a short, split tube, through which the compound body slides with perfect smoothness, forming the coarse adjustment for focus. The fine adjustment is effected by a micrometer screw and lever beneath the stage. The latter is furnished with light spring clips, for holding the object, and a revolving diaphragm with different-sized openings. The compound body is furnished with a first-class eye-piece (A or B, as desired); and the "*Society Screw*," whereby any objective of standard English or American make can be used on it. A coal-oil lamp on adjustable

stand, firmly secured to the base of the instrument, furnishes the illumination. For transparent objects, the light from the edge or width of the flame is allowed to fall directly upon the object, through the central aperture of the stage. For opaque objects, the lamp is raised to the top of its stand, and its rays allowed to fall upon a small concave mirror attached to the brass frame by an universal joint, whence they are reflected upon the object. The entire height of the instrument is about twelve inches, size of base ten by four inches, weight two and three-quarter pounds.

SINGLE MICROSCOPES.



No. 308.

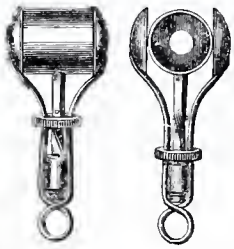
308. ***Improved Dissecting Single Microscope,*** $37 50
Stand with complete sliding and revolving Stage-plates; One Arm to carry the lenses, with rack-and-pinion adjustment; Side Condenser on lengthening arm; Mirror with complete adjustments; Two single lenses and Two Coddingtons, ¾ and ½-inch focus; the whole packed in a strong Mahogany Case.

ADDITIONAL APPARATUS.

309. Coddington Lens, 1-inch focus, ... $6 00
310. " " ¼-inch focus, ... 6 00
311. " " ⅛-inch focus, ... 6 00
312. Holder for Glass Slips, ... 2 00
313. Two Brass Saucers with Glass Bottoms, ... 2 50
314. Two Flat Glasses, ... 85
315. Two Concave Glasses, ... 2 00
316. One Piece of Box-wood covered with Cork, ... 65
317. One Gutta-Percha Tray loaded with Lead, ... 85
318. One Piece of Lead and Cork, ... 65
319. One Pair of Steel Forceps, ... 1 25
320. Two Pairs of Scissors, ... 3 56
321. One Needle-holder, ... 2 00
322. Two Knives, ... 2 00

No.		Price.
323.	Two Hooks,	$1 75
324.	Two Points,	1 75
325.	Wooden Tray for holding Dissecting Instruments,	2 75
326.	Box for containing additional Apparatus,	2 75
327.	All the above Additional Apparatus, from Nos. 309–326, if ordered at once,	37 50
328.	Binocular Prisms and Arm for carrying ditto,	18 00

CODDINGTON LENSES, etc.



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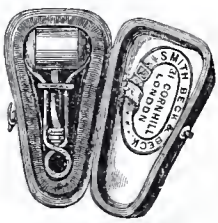

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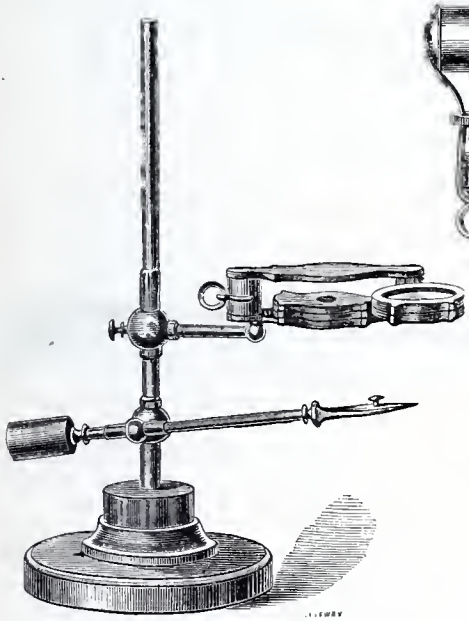

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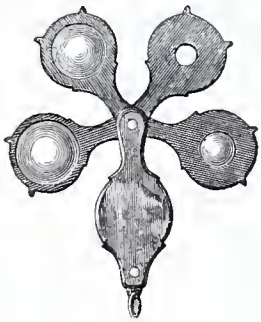


No. 346.

343.	Combination of Three Lenses, mounted in Tortoise-shell, on Brass Stand, with Adjusting Arms and Sliding Forceps for holding an object,	$10 00
344.	Combination of Three Lenses, in Tortoise-shell, on Brass Stand, with Adjusting Arm,	7 00
346.	Combination of Three Lenses, mounted in Tortoise-shell, for pocket,	4 50
347.	Coddington Lens, ¾-inch focus, mounted in Silver,	10 00
348.	" " ¾-inch focus, mounted in Aluminium Bronze,	10 00
349.	" " ¾-inch focus, mounted in German Silver,	8 00
350.	" " ½-inch focus, mounted in Gold,	20 00
351.	" " ½-inch focus, mounted in Silver,	7 50
352.	" " ½-inch focus, mounted in Aluminium Bronze,	7 50
353.	" " ½-inch focus, mounted in German Silver,	6 00

MOUNTING MATERIALS.

360. ***Collection of Mounting Materials and Dissecting Instruments,*** $100 00
Consisting of Wood-cutting Instrument and Chisel, Instrument for cutting circles of thin Glass, Glazier's Diamond, Writing Diamond, Cell-making Instrument, Brass Table and Lamp, Page's

No. PRICE.

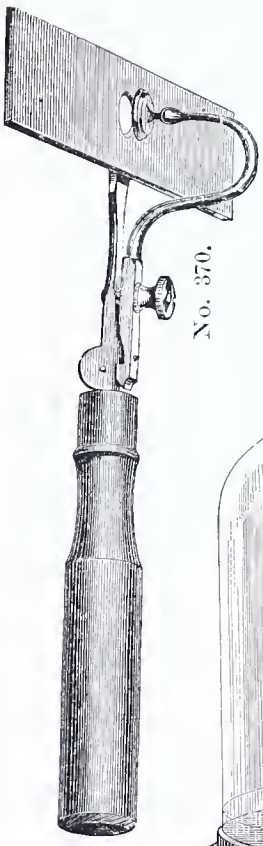
Forceps, Case of Dissecting Instruments, containing 4 Knives, 2 Hooks, 2 Points, 3 pairs of Scissors, 3 pairs of Forceps and Needle-holder, Valentin's Knife, 1 oz. Thin Glass, 9 dozen Slips, 3 inch by 1 inch, 3 dozen Wooden Slips, 3 dozen Glass Cells, 200 Labels, 5 Capped Bottles, containing Canada Balsam, Asphalt, Gold-size, Glycerine and Marine Glue, Bottle of Dean's Medium, 3 Stoppered Bottles for containing Chloroform, Nitric Acid and Liq. Potassæ.

361. ***Collection of Mounting Materials,*** $40 00

Consisting of Writing Diamond, Cell-making Instrument, Brass Table and Lamp, Page's Forceps, Case for Dissecting Instruments, 1 oz. Thin Glass, 6 dozen Slips, 3 inch by 1 inch, 3 dozen Wooden Slips, 2 dozen Glass Cells, 150 Labels, 5 Capped Bottles, containing Canada Balsam, Asphalt, Gold-size, Glycerine and Marine Glue, 1 Bottle of Deane's Medium.

The whole packed in a strong Mahogany Case.

No. 369.



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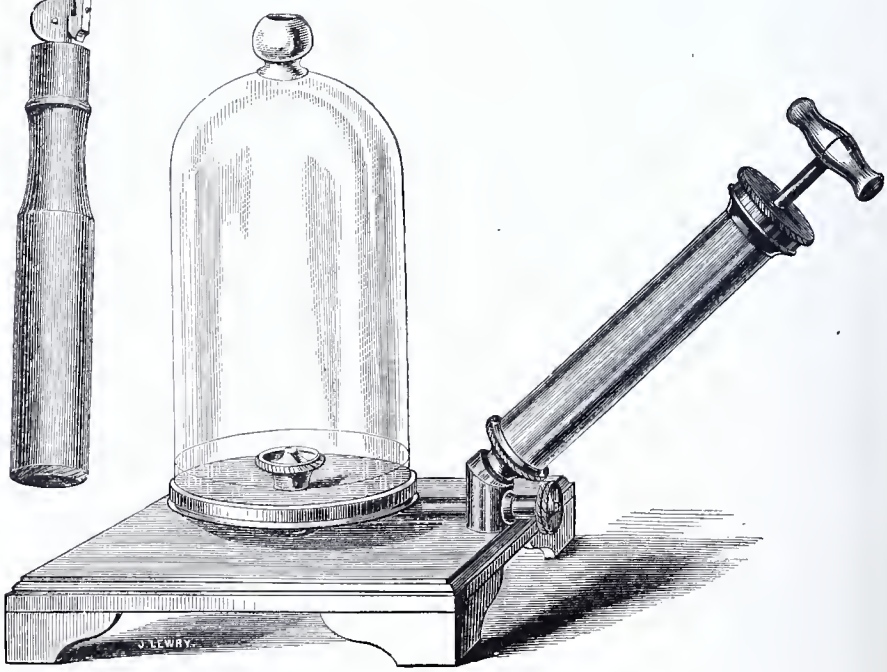


No. 372.

No.		Price.
362.	***Collection of Mounting Materials,*** Consisting of a Writing Diamond, Cell-making Instrument, Brass Table and Lamp, Page's Forceps, ½ oz. Thin Glass, 3 dozen Slips, 3 inch by 1 inch, 1 dozen Cells, 100 Labels, 5 Bottles, containing Canada Balsam, Asphalt, Gold-size, Glycerine and Marine Glue, Small Bottle of Deane's Medium. The whole packed in a Mahogany Case.	$25 00
368.	Improved Wood cutting Machine, with Chisel, packed in Mahogany Case,	9 50
369.	Page's Wooden Forceps, for holding Glass Slips, when heated,	85
370.	Smith's Mounting Instrument for pressing down the Cover on the Glass Slips, with a graduated pressure,	3 00
372.	Small Air-Pump and Receiver,	12 50

CABINETS FOR MICROSCOPIC OBJECTS.

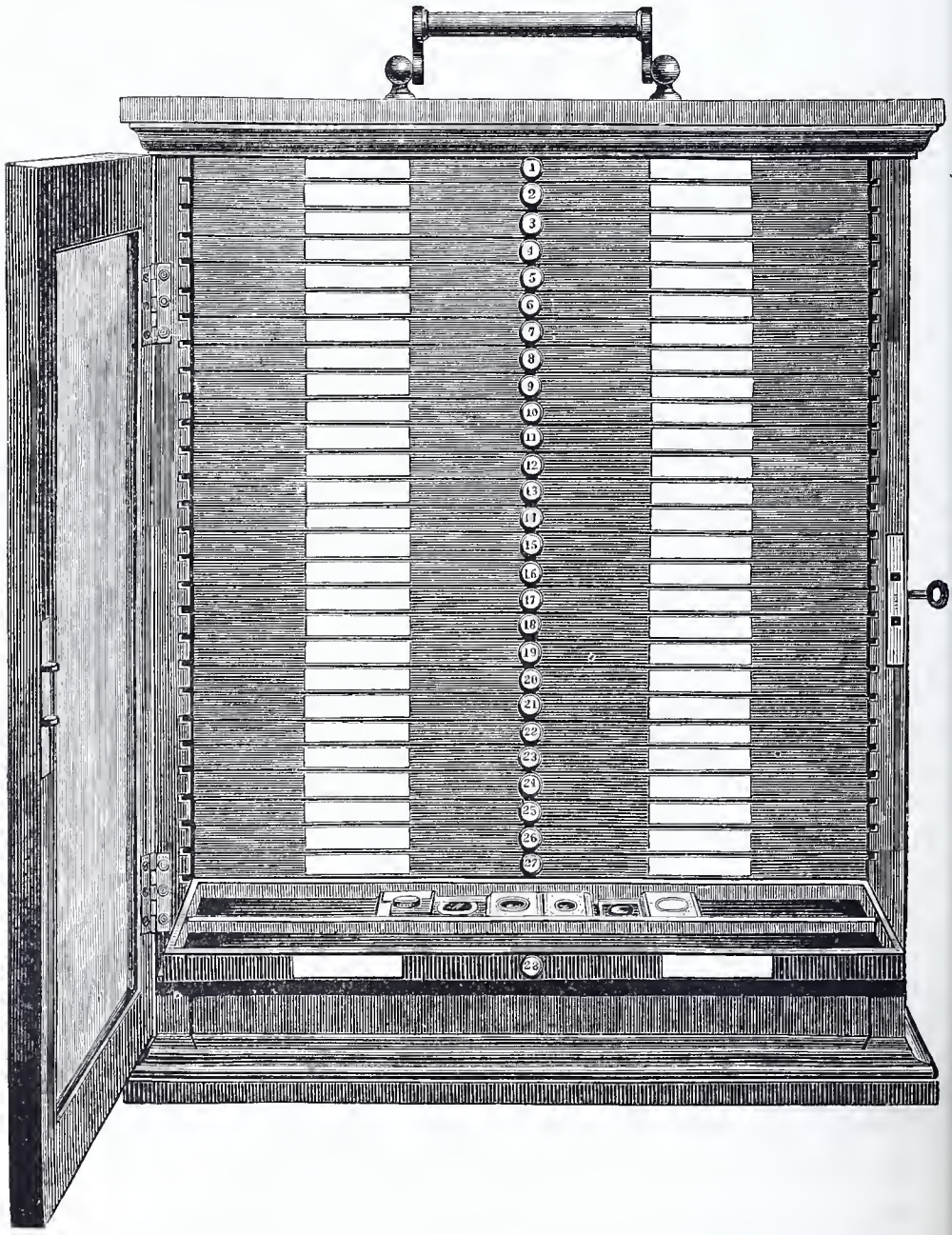
465.	MAHOGANY CABINET to hold 600 objects, with double glass doors and improved slide-rests, showing each object clearly when the drawers are pulled out, and allowing their easy removal,	$45 00
466.	BEST SPANISH MAHOGANY CABINET, with glass panel and deep drawers at bottom, to hold 1000 objects,	68 00
467.	HONDURAS MAHOGANY CABINET, without glass panel or deep drawers, to hold 1000 objects,	50 00
468.	BEST SPANISH MAHOGANY CABINET, with glass panel, to hold 750 objects,	47 00
469.	HONDURAS MAHOGANY CABINET, without glass panel, to hold 750 objects,	40 00
470.	BEST SPANISH MAHOGANY CABINET, with glass panel, to hold 500 objects,	36 00
471.	HONDURAS MAHOGANY CABINET, without glass panel, to hold 500 objects,	30 00

In the above Cabinets there are porcelain tablets let into the fronts of the drawers. The drawers are numbered and the specimens lie flat.

CASES FOR MICROSCOPIC OBJECTS.

472.	PORTABLE HORIZONTAL SLIDE CABINET, in Mahogany, with 12 Trays, to hold 12 doz. Objects,	$8 00
473.	PORTABLE HORIZONTAL SLIDE CABINET, in Mahogany, with 12 Trays to hold 6 doz. Objects,	5 00
474.	PORTABLE HORIZONTAL SLIDE CABINET, in Mahogany, with 6 Trays to hold 3 doz. Objects,	3 00
474.*	PORTABLE HORIZONTAL SLIDE CABINET, in Poplar, with 4 Trays to hold 2 doz. Objects,	2 00
475.	QUARTO BOOK CABINET, for 144 objects, fitted with Elastic Bands to keep the Objects in position,	10 00
482.	CARD-BOARD BOXES fitted with Racks to hold 12 Objects,	15
484.	POSTAL BOXES, to take 1 Object,	6
485.	" " " 3 "	8
486.	" " " 6 "	10
487.	" " " 12 "	12
488.	" " " 25 "	15

CABINET FOR MICROSCOPIC OBJECTS.

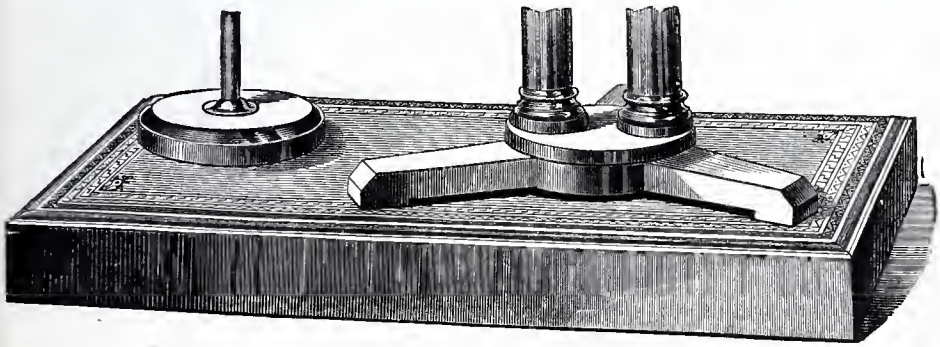


No. 466.

TABLES, etc.

No 491.

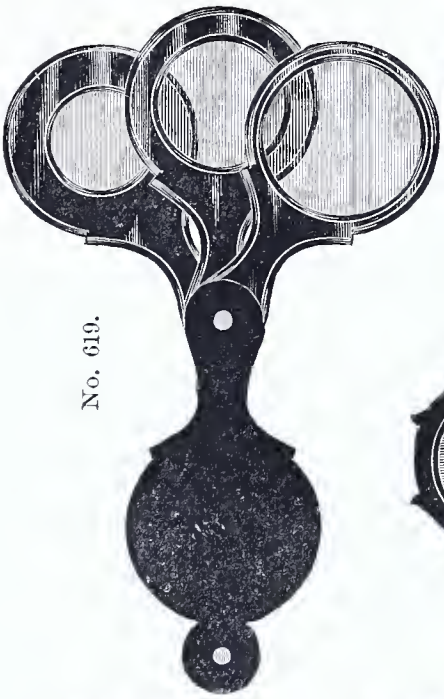
No.		Price.
491.	Revolving Table, especially arranged for Microscopic purposes, in Walnut or Mahogany, with handsome Leather Top, Gilt Border,	$50 00
492.	Revolving Table, iron frame, strong and steady, according to finish from,	$12 50 to 20 00
495.	Walnut-wood Stand, with Leather Top, on Rollers, to carry a Microscope and Lamp round a Table,	7 50
496.	Bell-Glass Shade and Stand, with handsome Leather Cover, to place over a Microscope,	7 50



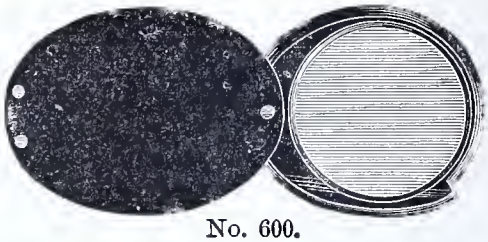
No. 495.

HAND MAGNIFIERS, etc.

600.	Oval-Shape,	Hard-Rubber	Case,	1	Lens,			about	$\frac{3}{4}$	-in.	diam.		50
601.	"	"	"	"	"	1	"	"	"	1	"		75
604.	"	"	"	"	"	1	"	"	"	$1\frac{3}{4}$	"		1 00



No. 619.



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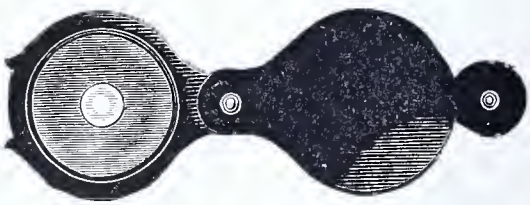
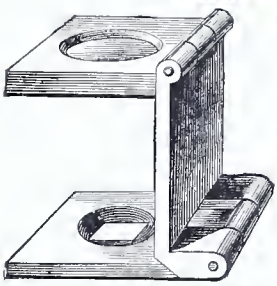
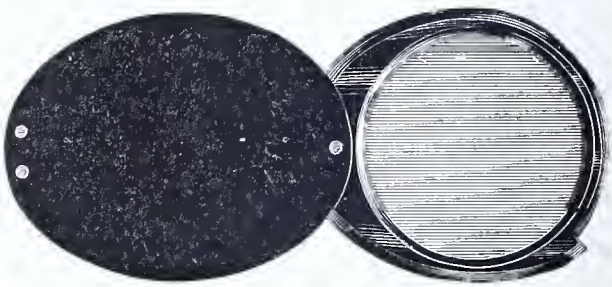


Nos. 607 to 609.



Nos. 625 and 626.



No. 601.

605.	Long-Shape, Hard-Rubber Case,	1	Lens,					about	$\frac{3}{4}$	-in.	diam.		50
606.	" " " " "	1	"	.	.	"	$\frac{15}{16}$	"					75
607.	" " " " "	1	"	with dia'm,		"	$\frac{5}{8}$	"					75
608.	" " " " "	2	"	"	"	"	$\frac{5}{8}$	"				1	00
609.	" " " " "	3	"	"	"	"	$\frac{5}{8}$	"				1	50
615.	" " " " "	2	"	.	.	"	$\frac{3}{4}$	"					75
616.	" " " " "	2	"	.	.	"	$\frac{15}{16}$	"				1	00
619.	" " " " "	3	"	.	.	"	$\frac{3}{4}$	"				1	00
620.	" " " " "	3	"	.	.	"	$\frac{15}{16}$	"				1	50
621.	" " " " "	2	"	.	.	$\frac{7}{8}$	and $\frac{1}{2}$	"				1	25
625.	Linen-Prover, Brass frame with	$\frac{1}{4}$	or	$\frac{1}{2}$	-in. Open Square,								50
626.	" " Nickel-plated,	"		"	"								75

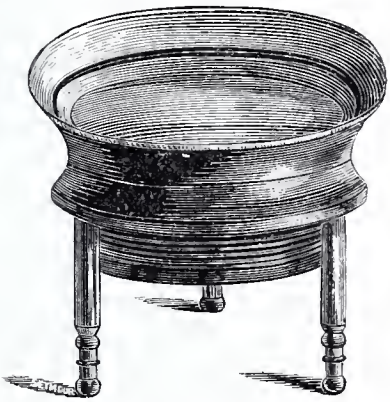
WATCHMAKERS' AND ENGRAVERS' GLASSES, etc.

630.	Watchmakers' Glass,	$\frac{7}{8}$	, 1-inch,	$1\frac{1}{8}$	-inches diameter,								50
631.	" "	with small lens, high power,											75
632.	Engravers' "	2 plano-convex lenses,				$1\frac{3}{8}$	-inches diam.,					1	50
633.	" " "	2	"	"		$1\frac{5}{8}$	"					2	00

No. 630.

No. 621.

No. 634.



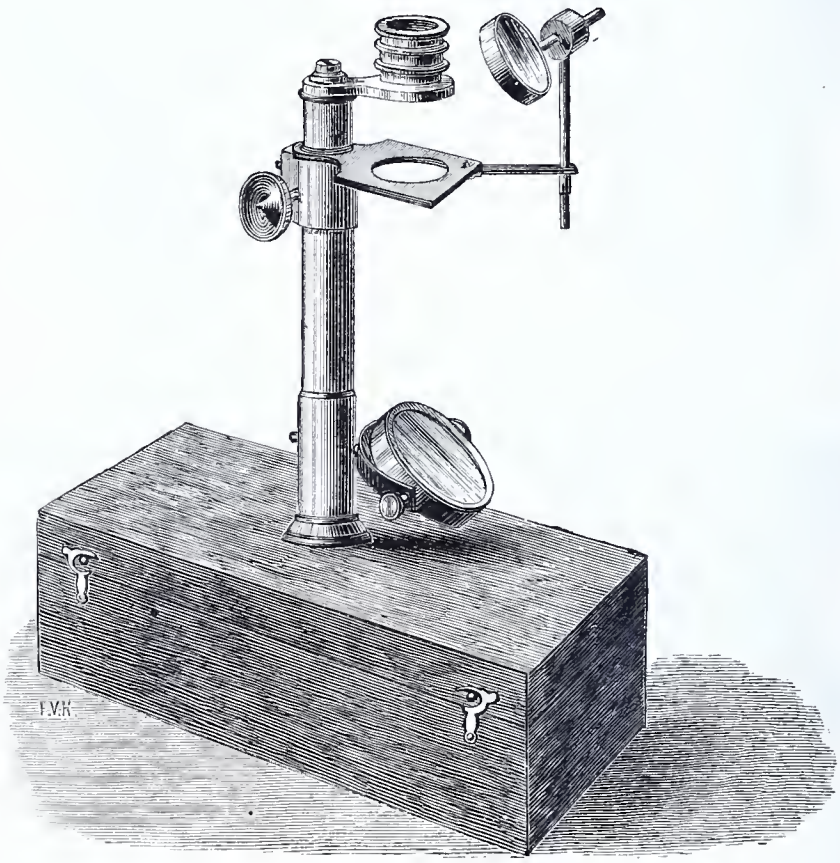
No. 639.

No.		Price.
634.	Engravers' Glass, with 2 plano-eonvex lenses, 1⅞-inches diam. .	$2 50
635.	Seed Mieroseope, with glass eage for living inseets, small size, .	75
636.	" " " " med. " .	1 00
637.	" " " " large " .	1 50
638.	Flower " " foreeps for living inseets, folds in pocket-case,	2 00
639.	Three-legged Microseope, Brass frame, 2 plano-eonvex lenses, adjustment for foeus, ...	4 75
640.	Three-legged Mieroseope, Rubber frame, 2 plano-eonvex lenses, .	1 00
641.	Three-legged Microscope, Steel frame, 2 plano-eonvex lenses, .	1 25

CODDINGTON LENSES.

642.	Coddington lens, Brass frame, small size, ...	1 00
643.	" " " medium size, ...	1 50
644.	" " " large, "	2 00
645.	" " Silver frame, with eover, ...	3 00
646.	" " Plated " " very fine article, . .	4 00
647.	" " " and engraved, " " . .	5 00

THE SCHOOL MICROSCOPE.



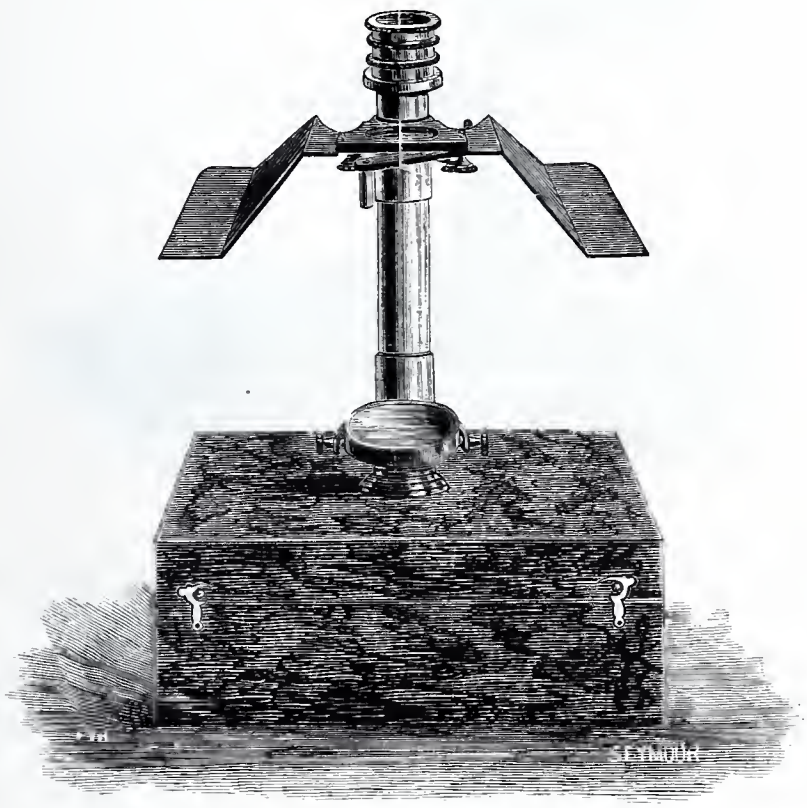
No. 650.

No.		Price.
650.	***The School Microscope,***	$6 00

This instrument consists of a tubular stem about five inches high, the lower end of which screws firmly into the lid of the box wherein the instrument is packed when not in use. To the upper end of this stem the stage is firmly fixed; while the lower end carries a concave mirror. Within the tubular stem is a round pillar having a rack cut into it, against which a pinion works that is turned by a milled head, and the upper part of this pillar carries a horizontal arm which bears the lenses, so that by turning the milled head, the arm may be raised or lowered, and the requisite focal adjustment obtained. Three magnifiers are supplied, and by using them either separately or in combination, a considerable range of powers, from about five to forty diameters, is obtained. A condensing lens for opaque objects, a pair of brass forceps and pliers, and an aquatic box for the examination of objects in water, are also supplied. This instrument is peculiarly adapted for educational purposes, being fitted in every particular for the examination of botanical specimens, small insects or parts of insects, water-fleas, the larger animalcules, and other such objects as young people may readily collect and examine for themselves; and those who have trained themselves in the application of it to the study of nature, are well prepared for the

advantageous use of the Compound Microscope. But it also affords to the scientific inquirer all that is essential to the pursuit of such investigations as are best followed out by the concurrent employment of a Simple and a Compound Microscope, the former being most fitted for the preparation, and the latter for the examination of many kinds of objects.

THE SCHOOL DISSECTING MICROSCOPE.



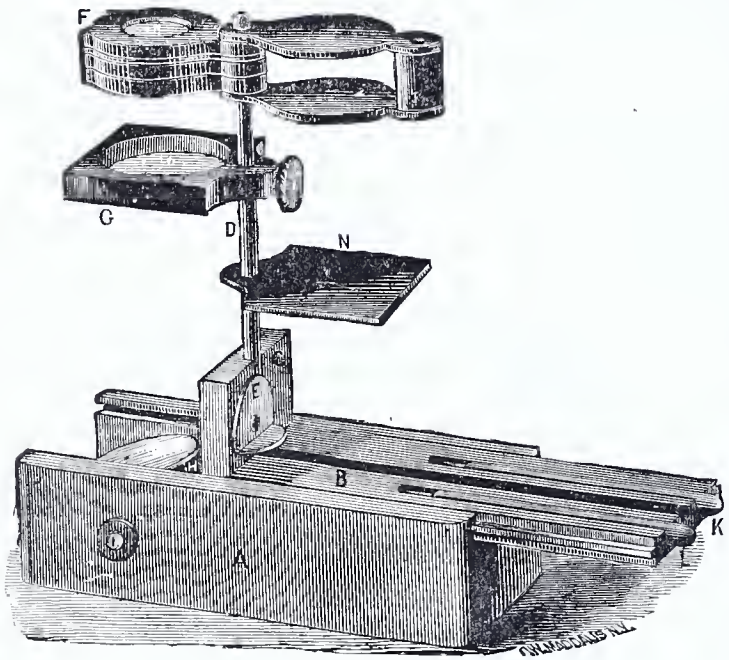
No. 651.

651. ***The School Dissecting Microscope,*** $8 00

This instrument is the same as *The School Microscope*, No. 650, with the addition of two hand rests, as shown in the illustration, which at once convert it into a most excellent and convenient *Dissecting Microscope.* They are attached to the stage by milled heads, and are instantly removed if desired. The whole, microscope, lenses and hand rests, can be packed in the case, which measures six by three inches, and two and a quarter inches deep.

The Lenses are of a most excellent quality, the Stand firm and well finished, and it would seem impossible to improve on this really excellent instrument, either in compactness, efficiency or cheapness. The accompaniments are the same as those with No. 650.

THE EXCELSIOR POCKET AND DISSECTING MICROSCOPE.



No. 652.

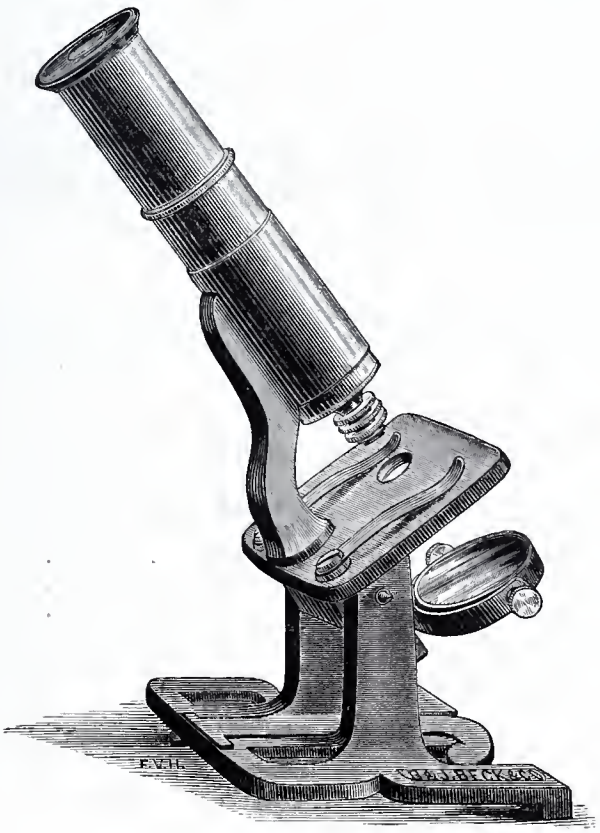
652. The Excelsior Mieroseope, with Three Lenses, ... $2 75
653. " " with Two Lenses, ... 2 50
Set of three hard rubber Slides, with openings of different kinds,to serve as linen provers, ... 25

The eonstruetion and method of using this Mieroseope is very simple, and will be readily understood from an inspeetion of the engravings. It consists primarily of a small wooden case, the exaet size of that shown in the engraving. To one end of the lid of this ease is attaehed one of the ends of the box; and when the lid is reversed and turned upside down, it may be slid into the groove of the case, and then forms a stand for the lenses and glass stage, as shown in Fig. 652. The lenses and stage are supported by a steel rod, the lower end of whieh is hinged to the lid, so that it may be turned down and lie in a groove provided for it. When raised into the position shown in the figure, it is held very securely in place by means of a button; and this button also serves to retain it in the groove when it is turned down. The glass stage, whieh is fitted into a frame of hard rubber, slides easily on the stem, so as to be readily adjustable for focus, while at the same time it may be firmly fixed, by means of a set-screw, at any desired height, and will then serve as a stage for disseeting purposes. The frame which holds the lenses fits on the top of the stem. A mirror is fitted into the case, and is readily adjustable by means of the button shown on the outside, so that light may be refleeted up through the stage when the objects to be examined are transparent; and when they are to be viewed by reflected light, there is a dark ground of hard rubber, which is also carried by the stem, and may be turned under the stage, so as to cut off all transmitted light. Disseeting needles, with neat handles, fit into appropriate grooves.

655. ***Boys' Compound Microscope,*** $2 50

This instrument is a well-made and substantial one, and well adapted to the study of objects requiring rather more power than can be conveniently obtained with a *simple* microscope. It will show satisfactorily the larger animalculæ in pond-water, the scales from a butterfly's wing, and similar minute objects. The stand is of polished brass handsomely lacquered, with one eye-piece and one object-glass, magnifying when combined about 40 diameters or 1600 times. One prepared object, two glass slips and a pair of brass forceps, are furnished with it, and the whole is packed in a neat, polished walnut-wood case.

THE UNIVERSAL HOUSEHOLD MICROSCOPE.



No. 660.

660. ***The Universal Household Microscope,*** $5 00

There are a number of Microscopes under this name in the market, and in adding ours to the list, we have endeavored to add to their efficiency and convenience, whilst somewhat reducing the cost.

The Stand is ten inches in height, with hinged joint, allowing it to be inclined

to any angle for convenience of observation. The base is of east-iron, the design forming the monogram, R. & J. B., handsomely bronzed, the compound body of finely lacquered brass, with draw-tube for increasing the power. The object-glass is of three powers, usable separately or combined, magnifying from about 20 to 100 *diameters*, or in popular terms from 400 to 10,000 *times*. The markings upon the scales of butterfly's wings, and most animalcules in pond-water are very well shown by these glasses. A pair of brass forceps, two glass slips, and one prepared object accompany it, the whole contained in a neat and strong walnut-wood case.

661. THE UNIVERSAL HOUSEHOLD MICROSCOPE, the same as 660, with an *Achromatic Object-Glass* of three powers, in place of the one furnished with 660, magnifying from 30 to 150 diameters, with excellent definition, entirely free from color, ... $8 00

662. THE UNIVERSAL HOUSEHOLD MICROSCOPE, the same as 660, with addition of Rack and Pinion for coarse adjustment of focus, condenser for illumination of opaque objects, packed in handsome mahogany case, ... 8 00

663. THE UNIVERSAL HOUSEHOLD MICROSCOPE, the same as 662, with addition of Achromatic Object-Glass magnifying 250 diameters, . 12 00

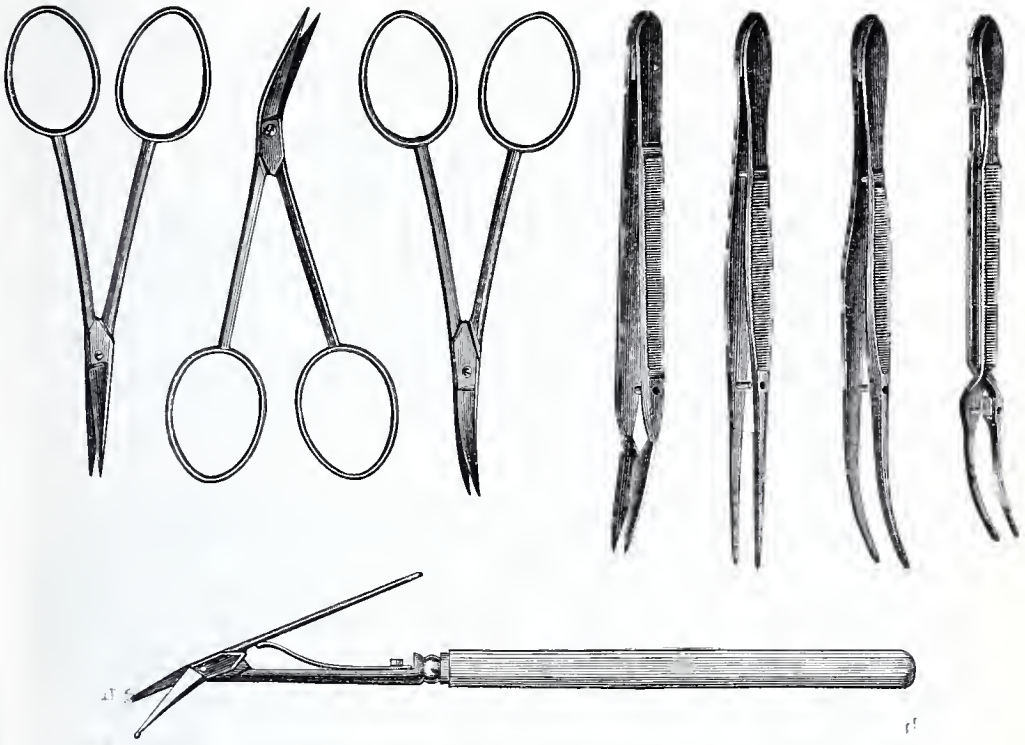
ACHROMATIC OBJECTIVES. (French Manufacture).

These object-glasses are all *triple* combinations exeepting the first, which is a doublet; and are really well correeted lenses, giving a clear, well-lighted field with excellent definition. They all have the *French Screw*, but can be fitted with the *Society Screw* for an additional cost of 75 cents each.

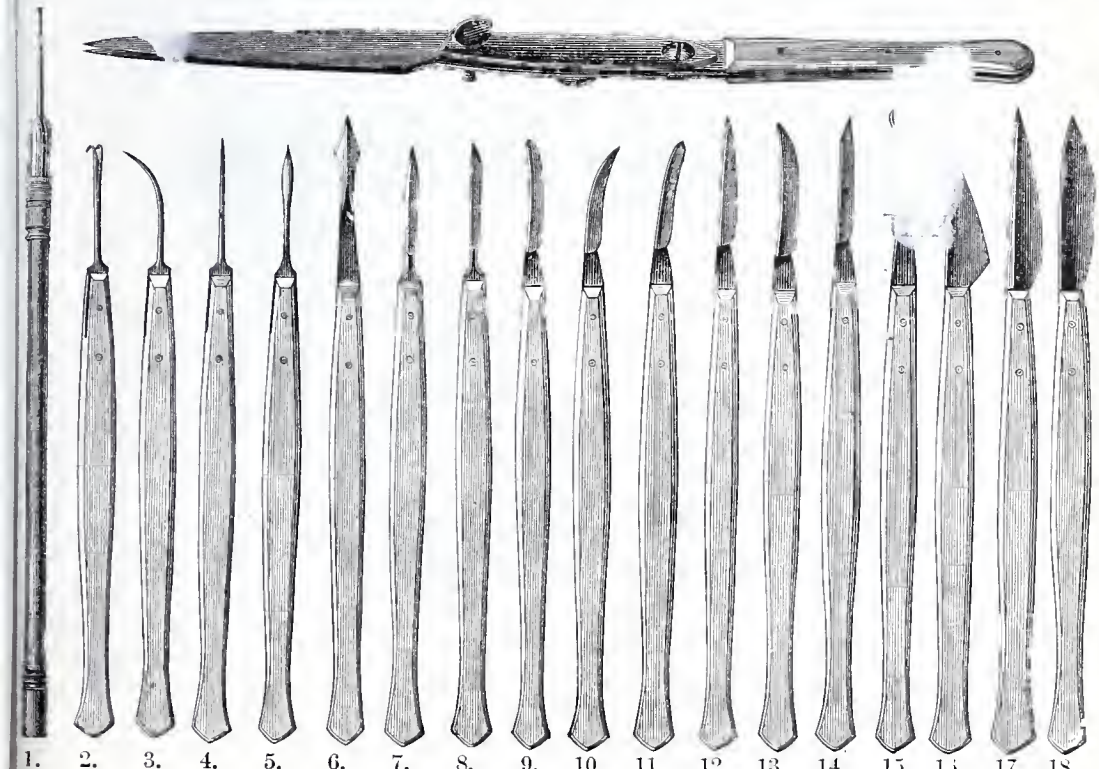
764. Achromatic Objective No. 0, 1-inch, doublet, ... 50
765. " " " 1, ½ " triplet, ... 3 00
766. " " " 2, ¼ " " 50
767. " " " 3, ⅙ " " 4 00
768. " " " 4, ⅛ " " 5 00
769. " " " 5, 1/10 " " 7 00
770. " " " 6, 1/15 " " 10 00

DISSECTING AND MOUNTING INSTRUMENTS AND MATERIALS.

781. Spring Compressor, Nickel-Plated, per doz., ... 1 00
782. " " Wood " 25
783. Forceps, brass, 3 inches long, ... 25
784. " Quekett's for taking objects out of deep bottles, . . 2 50
785. " Bull-nose, ... 1 00
787. " Steel Nickel-plated, straight, 4 inches long, . . . 1 00
788. " " " curved, 4 " 1 00
789. " " " " 4 " very delicate, 1 50
790. " " " straight, 4 " " " 1 50
791. Scissors for dissecting, straight blades, very delicate, . . . 1 50
792. " " blades curved on the flat, ... 1 50
793. " " elbow blades, ... 1 50
794. " " " " very strong, ... 1 25
795. " " with spring, exceedingly delicate, . . 6 00
796. Knife, " cutting blade, ebony handle, ... 75
797. " " scalpel " " 75
798. " " trowel " " 75
799. " " double-edge blade, " 75

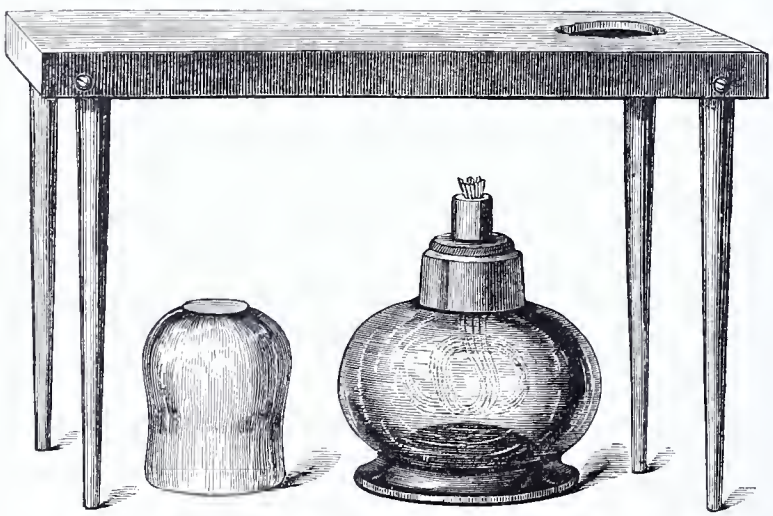


Nos. 789 to 793.



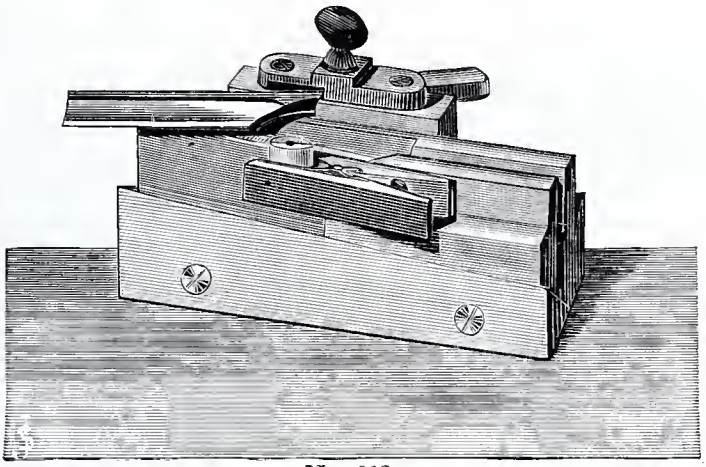
Nos. 796 to 805.

No.		Price.
800.	Knife, Valentine's, for cutting sections of soft tissues,	$6 50
801.	" for using with section cutters, heavy blade, in Morocco case,	3 50
802.	" " " " " very heavy broad blade, in Morocco case,	5 00
803.	Needle, for dissecting, straight point, ebony handle,	15
804.	" " hook " "	15
805.	Needle-holder, for dissecting, with binding screw,	75
806.	Case of Dissecting Instruments, containing 1 pair forceps (788), 1 pair scissors (793), 2 dissecting knives (796, 798), 2 needle-holders (805), with needles,	7 50
807.	Case of Dissecting Instruments, containing 1 pair forceps (787), 1 pair ditto (789), 1 pair scissors (792), 1 pair ditto (793), 3 dissecting knives (796, 797, 799), 1 Valentine's knife (800),	15 00
808.	Section Cutter, Dr. Ranvier's pattern, with glass top, and binding screw for holding wood and other hard substances,	7 50
809.	Section Cutter, Army Medical Museum pattern, with glass top, and clamp for fastening to table,	10 00
810.	Section Cutter, (Dr. Bevan Lewis's Ether Spray Freezing Microtome), Army Medical Museum pattern, complete with atomiser,	20 00
811.	Section Cutter, (Rutherford's Microtome), Army Medical Museum pattern, large size, with ice-box for freezing,	15 00
812.	Section Cutter, pattern of M. Rivet, with knife, complete in box,	15 00
813.	Injecting Syringe of brass, with four pipes and stop-cock, in wooden case,	8 00
814.	Injecting Syringe, German Silver, with six pipes and two stop-cocks, in fine Morocco case,	12 00
814.*	Hypodermic Syringe, in Morocco case,	4 00
815.	Turn Table, with Walmsley's centering adjustment,	4 00
816.	" " Shadbolt's,	3 00
818.	" " Cox's, self-centering for both length and width,	6 00



No. 819.

819.	Brass Table, with lamp for mounting, with balsam,	2 50
819.*	Brass Table and Lamp, small size,	1 50
820.	Flatted Crown Glass Slips, Chance's Best, 3x1 inch, cut edges, per dozen, 20 cents, per gross,	2 00



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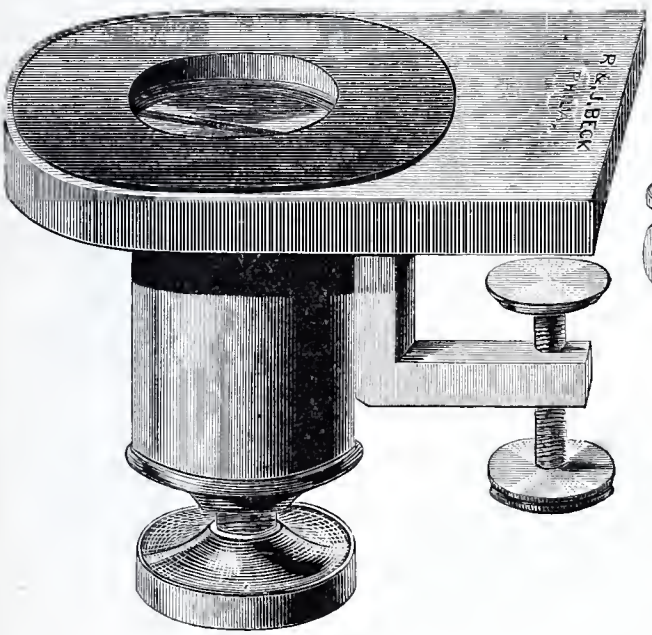

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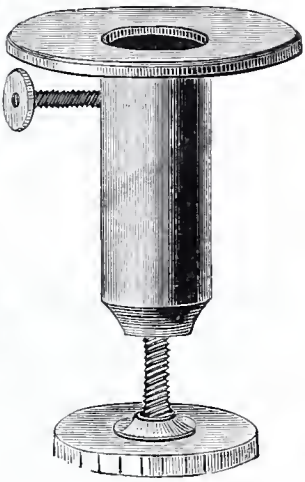

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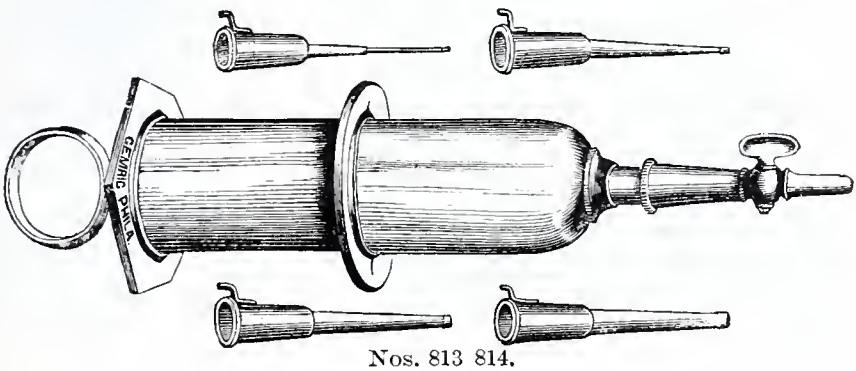
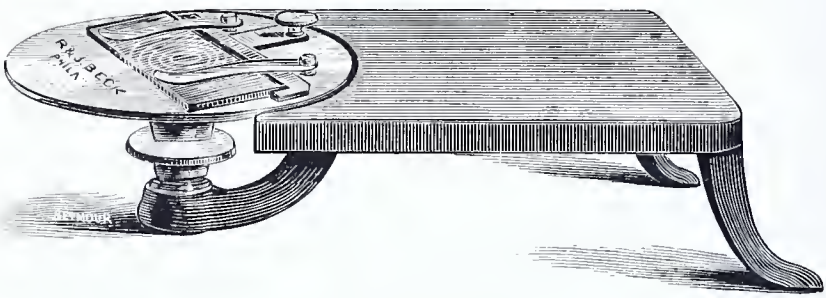


Nos. 813 814.



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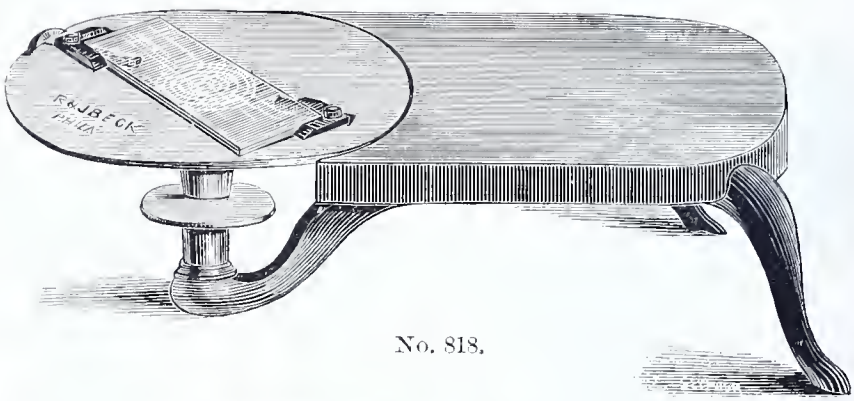
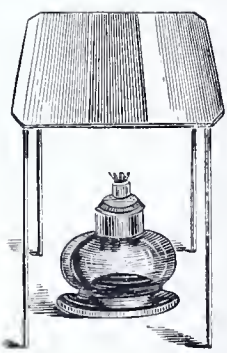


No. 818.

No. 874.



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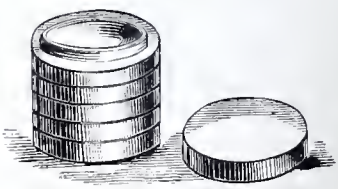
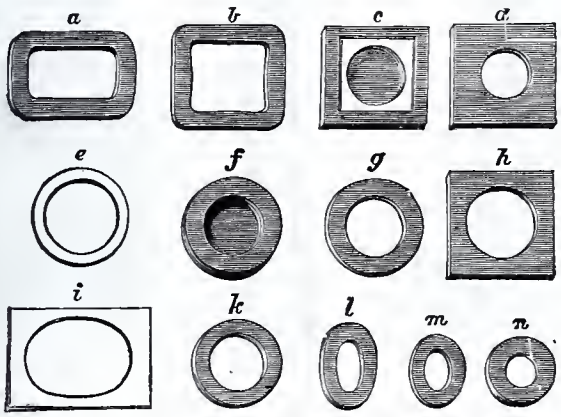


No. 875.

No.		Price.
821.	Flatted Crown Glass Slips, Chance's Best, 3x1 inch, smoothed edges, per dozen, 35 cents, per gross,	$4 00
822.	Plate Glass Slips, Chance's Patent, 3x1 inch, cut edges, per dozen, 30 cents, per gross,	3 00
823.	Plate Glass Slips, Chance's Patent, 3x1 inch, smoothed edges, per dozen, 50 cents, per gross,	5 00
824.	Plate Glass Slips, Chance's Patent, 3x1 inch, extra thin, smoothed edges, per dozen, 55 cents, per gross,	6 00
825.	Wooden Slips, 3x1 inch, with hole in centre, used in mounting objects between thin glass, or opaque, per dozen,	25
826.	Glass Slips, with Hollow, 3x1 inch, smooth edges, per dozen,	1 50
827.	Glass Slips, 3x1 inch, smooth edges, with cells of various sizes, shapes and depths, attached by marine glue, ready for use, per dozen,	2 50



No. 828.

828.	Glass Cells, of various sizes, shapes and depths, per dozen,	$1 00
829.	Block-Tin Cells, of various sizes and depths, for fluid and balsam mountings, per dozen,	50
830.	Hard-Rubber Cells, of various sizes and depths, for dry and opaque mountings, per dozen,	15
831.	Thin Glass, in sheets, No. 3, $\frac{1}{50}$ to $\frac{1}{100}$, per oz.,	75
832.	" " " " No. 2, $\frac{1}{100}$ to $\frac{1}{150}$, "	1 25
833.	" " " " No. 1, $\frac{1}{150}$ to $\frac{1}{200}$, or thinner, per oz.,	1 75
835.	" " " squares, No. 3, per dozen, 20 cents, "	1 50
836.	" " " " No. 2, " 25 " "	2 25
837.	" " " " No. 1, " 30 " "	3 00
838.	" " in circles, No. 3, per dozen, 25 cents, per oz.,	2 25
839.	" " " " No. 2, " 30 " "	3 00
840.	" " " " No. 1, " 35 " "	4 00
841.	Watch Glasses, all sizes, each 7 cents, per dozen,	75
842.	Dipping and Dropping Tubes, each,	10
843.	Pippets, with bulb,	25
844.	Test Tubes, all sizes, each, 3 to 8 cents, per dozen,	30 to 75
845.	Bell Glass, for preserving objects from dust during preparation,	50
847.	Canada Balsam, pure, in collapsible tubes,	25
848.	" " in chloroform, requires no heat, per bottle,	50
849.	" " in Benzole, " " " " "	50
850.	Damar, " " " " "	50
851.	Glycerine, pure, " "	25

No.		Price.
852.	Glycerine, Camphorated, for mounting fresh-water algæ, per bottle,	25
853.	" Jelly,	50
854.	Deane's Medium,	35
855.	Farrant's Medium,	60
856.	Absolute Alcohol, (Dr. Squibb's,)	25
857.	Benzole, Pure,	25
858.	Brunswick Black,	25
859.	Asphalte,	25
860.	Gold-Size,	25

No. 869.

No. 847.

No. 861.

861.	Marine Glue,	per bottle,	35
862.	Oil of Cloves,	" "	50
863.	Bell's Cement,	" "	50
864.	White Zinc Cement,	" "	50
865.	Punches, various sizes, ¼ inch to 1 inch,	each,	50 to 1 25
866.	Instrument for cutting circles of thin glass, in case,		10 00
867.	Glaziers' Diamonds, from		4 00 to 10 00
868.	Writing Diamonds, each,		3 50

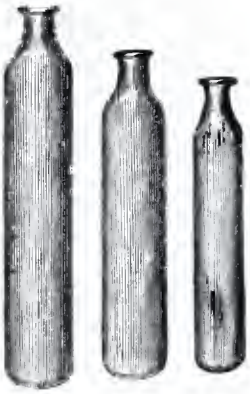
No. 866.

No. 867.

No. 868.

No. 872.

No. 872.*



No. 872.

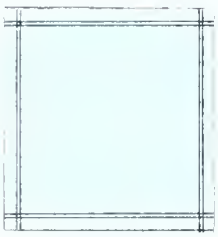
No.		Price.
869.	Capped Bottles for containing fluid used in mounting objects, each,	50
870.	Dropping " with glass bulb stopper, ... "	25
871.	" " " rubber top " . . . . . "	30
872.	Small Collecting Bottles, ... per dozen,	30 to 1 00
872.*	Capillary Bottles, ... each,	50
873.	Wright's Diatom Collecting Bottle, complete in case, . . .	4 00
874.	MOUNTING CABINET, as arranged by Mr. Walmsley; containing 6 compressors, *wood* (782), 6 ditto Nickel-Plated (781), Steel Forceps (788), Scissors (793), Knife (796), Needles (803 and 804), Turn-table (815), Brass Table and Lamp (819*), ½ gross slips (821), ½ oz. assorted Squares and Circles (836 and 839), 1 doz. Hard-Rubber Cells (830), 1 doz. Block-tin Cells (829), 3 Watch-glasses (841), Dropping Tube (842), Tube of Balsam (847), Damar (850) or Balsam (849), Glycerine (851), Glycerine Jelly (853), Hæmatoxylon (877), Brunswick Black (858), Gold-size (860), Oil of Cloves (862), White Zinc Cement (864), Dropping-bottle (871), 1 Nest of Saucers (875), wide-mouth Glass Jar for Solutions, 2 Camel's-Hair Brushes in long handles. The whole packed in a polished mahogany cabinet with lock, ...	25 00
875.	Porcelain Saucers, in nests of 5 with cover, all fitting, dust tight. The most useful of all articles in staining tissues and soaking in oil of cloves, (two sizes), ... 75 and	1 00
876.	Hot-water Drying Case, for drying tissues and hardening Balsam mountings, will harden twelve dozen specimens at once, . .	12 00
877.	Hæmatoxylon, ...	25

STAINING AND INJECTING FLUIDS, Etc.

878.	Ammonia Carmine, ... per bottle,		25
879.	Borax " . . . . . " "		25
880.	Indigo " . . . . . " "		25
881.	Methyl Aniline, Green, ... " "		25
882.	Iodine " " . . . . . " "		25
883.	Magenta " Red, ... " "		25
884.	Violet " . . . . . " "		25
885.	Blue " . . . . . " "		25
886.	Eosin, ... " "		25
887.	Neutral Carmine, (Dr. Beale's,) . . . . . " "		50
888.	Carmine Injecting Fluid, (Dr. Beale's,) . . . . " "		50
889.	" " Gelatine, (Dr. Seiler's,) . . . " oz.		1 00

One oz. of this Gelatine dissolved in ten oz. of distilled water forms an admirable Injecting Fluid.

LABELS, etc., FOR MICROSCOPIC OBJECTS.



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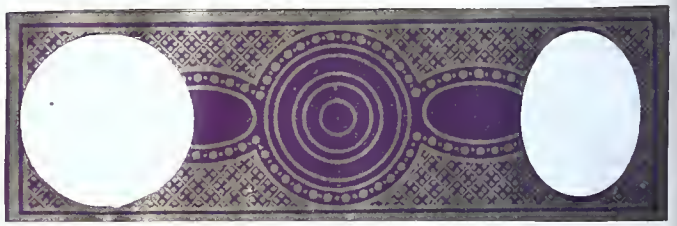

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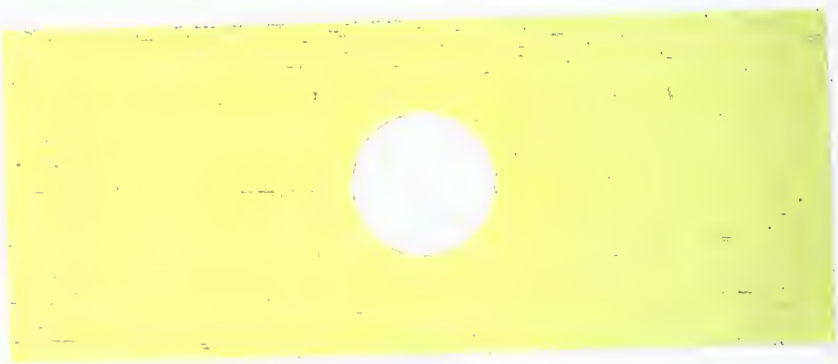
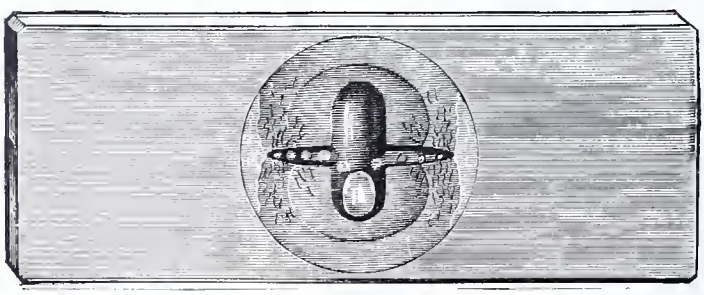


893

No.			Price.
890.	Adhesive Labels, Plain White, Round or Oval, . .	per box,	10
891.	" " Assorted Colors, Square, neatly bordered,	" 100,	25
892.	" Fronts for covering slides, handsome gold design	" 100,	30
893.	" Backs " "	" 100,	10
	Backs or fronts if with holes punched, *extra*, . , .	" 100,	15

HOLMAN'S LIFE AND CURRENT SLIDES.



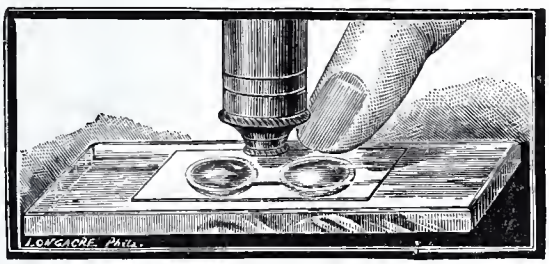
No. 895.

These very useful and ingenious accessories to the Microscope are attracting great attention among scientific men everywhere, and have received the strongest commendations from Medical and other Scientific Journals at home and abroad. By an arrangement with the inventor we are enabled to supply them to our customers of the most perfect quality, each one having passed through Mr. Holman's hands before being delivered to us.

895. ***Holman's Life Slide,*** with Cover in a neat Box,. $1 50

The Life Slide consists of a plate of thick glass 3 x 1-inch, with a deep oval cavity ground in its centre, to contain the mass of material under observation. Around the margin of this oval cavity is a polished bevel, and from the bevel extends a small cut, the object of which is to afford an abundance of fresh air to the living things within. It is found upon inclosing the animalculæ, etc., that they will invariably seek the edge of the pool in which they are confined, and the beveled edge permits the observer to take advantage of this disposition; for when beneath it, the objects are within the range of the highest powers.

The Life Slide is constructed to retain the greatest quantity of material under the smallest cover glass, and is designed to be used with the highest powers of the Microscope for studying the Bacteria, Vibriones and other low forms of life. For studying the circulation of the blood in the tail of the Tadpole, it is the most perfect contrivance imaginable. The deep oval cavity will contain the body of a small Tadpole, whilst the tail lies extended in the beveled portion, and may be examined with the highest powers. Another very important feature in the device is the fact that a preparation may be kept with it for days or weeks together without losing vitality, owing to the simple arrangement for supplying fresh air.



No. 896.

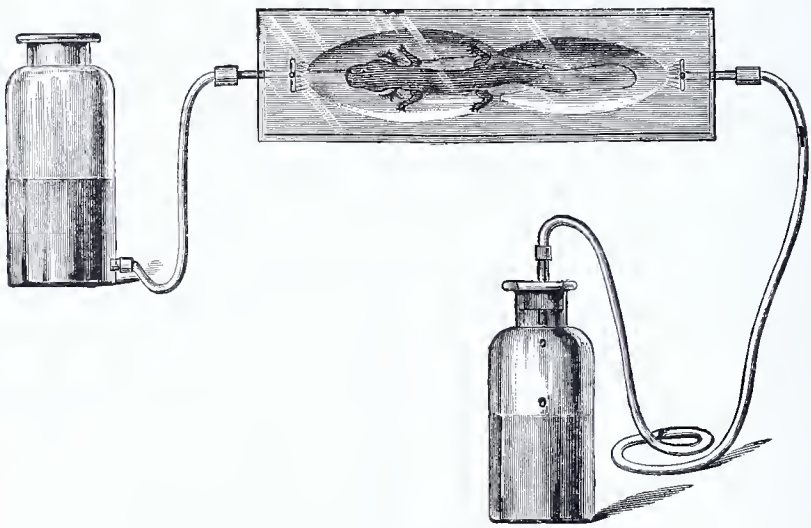
896. ***Holman's Current Slide,*** with Cover, in a neat Box, . . . $1 50

The Current Slide, consists of a slip of plate-glass 3 x 1 inch, in which two oval concave cells are ground, there being a space of $\frac{1}{12}$ inch left between the cells. These cells, which are about $\frac{1}{2}$ inch in diameter and as deep as the glass will permit—say $\frac{1}{16}$ inch deep—are united by a very shallow channel somewhat below the centre of the two cells, so that with cells placed $\frac{1}{12}$ inch apart, the channel is about $\frac{3}{12}$ inch long. Both the cells and channel are polished. If a few drops of blood be placed in the cells, and a cover of thin glass be pressed down, some of the blood, finding its way between the surfaces in contact, will dry, and act as a cement to hold the fluid blood in the cells in place. The quantity of blood being insufficient to fill the cells, a considerable amount of air becomes imprisoned with the blood, and the expansion of the air in either cell will drive the blood through the channel into the adjacent cell, and in the shallow channel it is presented under the most favorable condition for examination. By holding the top of the finger near one or the other cells, the heat is enough to cause the expansion and a consequent more or less rapid flow of the fluid through the channel. This flow may be arrested, or continued and reversed at will, by change of the position of the finger, so that any particles floating in the liquid can pass in succession across the field, but can be arrested and examined with ease at will.

So sensitive is the apparatus, that even with the highest powers, a corpuscle, granule or cell in the field of view, may be leisurely turned over and over in any desired position, thus affording an unequaled means of observation and study to the microscopist; and while the eye is examining at leisure the

behavior of the objects beneath it, the mind is charmed with the simplicity of the means by which their motions are controlled.

Blood or other fluid inclosed in the cells remains in good condition for examination for several days, and changes undergoing in the fluid can be examined.

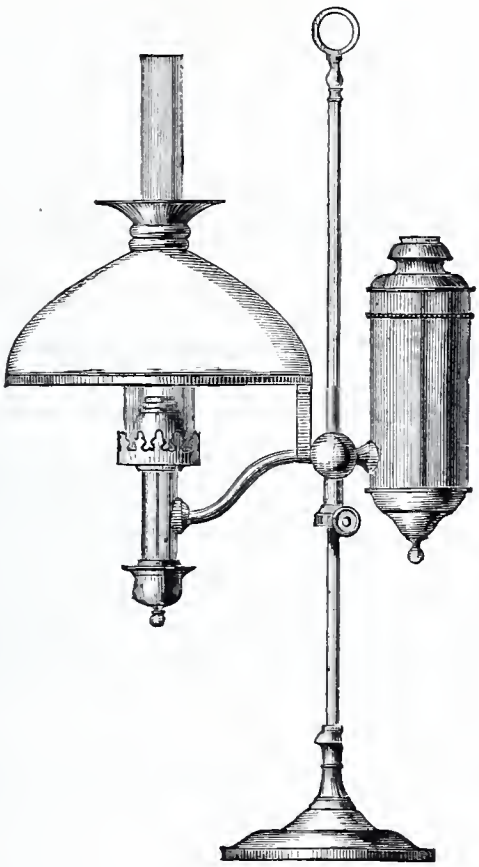


No. 897.

897. ***Holman's Syphon Slide,*** complete, with Flexible Tubes and Glass Cover, but without Bottles, ... $4 00

This is a modification of the "LIFE" and "CURRENT" slides, whereby living objects of suitable size and habits can be retained under observation uninterruptedly for days or even weeks. A current of water, or other fluid, is made to flow continuously through the chamber containing the object, so that the processes of respiration, circulation, digestion and nutrition, the phenomena of inflammation, and the effects of some classes of poisons, may be studied at leisure and under perfectly natural or entirely controllable conditions. The habits of life of small aquatic animals are similarly brought within reach of our observations. For use with the Magic Lantern, in projecting the images of living objects upon the screen, this apparatus is absolutely perfect—the flow of fresh water through the chamber being so constant that its inmates are entirely free from inconvenience during the most protracted exhibition.

The following description of the SYPHON SLIDE will render its construction and use quite clear. In a slip of thick plate glass, a chamber is excavated similar to that in the LIFE SLIDE. In each end of this chamber are fine perforations, too small to permit the escape of the animal under view, but sufficient to maintain a flow of water. These openings merge into tubular mouths, to each of which is attached a tightly-fitting elastic tube: one of these communicates with the reservoir of water, whilst the other acts as an escape-conduit. The position of the slide, when in use, must be slightly *above* the level of the reservoir, while the escape-tube must rest *below* the same, thus insuring a veritable *syphon* action in the apparatus; a constant flow of water being secured in connection with the required atmospheric pressure for the retention of the cover on the slide. It is not necessary to have bottles specially fitted for use with this apparatus; any vessel capable of holding water will answer, it being only necesary to insert the end of one tube in the reservoir, and by gently sucking at the end of the other establish a flow of the water, which will continue so long as the reservoir contains any.



No. 900.

900. ***Saint Germain; or, German Study or Office Lamp, Brass,*** . $6 00

Directions for Use.—To fill the lamp, take out the holder, invert it and pour in the oil till it reaches the valve; then pull up the valve by means of the wire; invert it, holding it above the holder, so that any oil which may escape drops into this holder; replace it in the holder.

This lamp gives a very superior and steady light, and with ordinary care will emit neither smell nor smoke.

Testimonials have been given by highest authority as to its safety against explosions.

The wick should be trimmed regularly. If a crust has formed, do not disturb it, but only remove any little point or unevenness that may occur; do not use the scissors unless the wick, through uneven draft, should have coaled or charred unevenly. By this method you will have an even flame, and the wick will last much longer than when cut frequently. If your lamp should make a humming noise, which is caused by the shank of the chimney being of the wrong length, raise the chimney slightly, or change it for one with a longer shank.

901. German Student's Lamp, Nickel-Plated, ... 7 50
902. Blue or Green Porcelain Shades, ... 1 00
903. Blue Chimney, ... 20
904. White " 15
905. Mineral Wick, (incombustible), ... 50

A CLASSIFIED LIST

OF

FIRST-CLASS MICROSCOPIC OBJECTS.

INCLUDING THE BEST PREPARATIONS OF AMERICAN AND FOREIGN ARTISTS.

It is not intended in the limited extent of this list to enumerate even a small portion of the immense number of preparations in every department of Science with which our Cabinets are filled, but merely to call attention to the leading ones in each.

It is our aim to furnish, if possible, any slide that may be ordered, and if not in stock, we shall spare no pains to obtain it. Any number of preparations will be sent to any address (with satisfactory references) for examination, securely packed, but at the risk and cost of the party to whom sent. This is a great convenience to those residing at a distance, who cannot conveniently visit our rooms for selection.

Prices have been materially reduced from former rates, and it will always be our endeavor to furnish the most perfect preparations at the lowest rates. Our Popular and Household Series of objects are most excellent and varied in character, and remarkably cheap, (in price only,) since their quality is very good.

The Messrs. Cole & Son's Anatomical and Diatom preparations are uniformly the best that have thus far been produced, and they will hereafter supply us exclusively.

Dr. Schaeffer, of Washington, and Dr. Seiler, of Philadelphia, will also supply us with their unsurpassed Histological and Pathological Specimens.

Our Double Stained Vegetable preparations, (Mr. Walmsley's) are attracting marked attention at home and abroad. The following notice of the Messrs. Cole's speaks for itself:

(*From the* BRITISH MEDICAL JOURNAL, *Oct.* 30, 1875.

We have just had an opportunity of inspecting a series of microscopic slides prepared by Arthur C. Cole & Son, of Liverpool. These slides illustrated both healthy and morbid tissues, and the sections brought out well the different structures, and were chosen from good specimens. As to the mounting, it was all that could be desired, and the sections, in size and amount of surface, exceed anything we have hitherto seen. The staining is done by a process peculiar to Messrs. Cole, and is far superior to any in use elsewhere. Taken altogether, they are the most perfect and beautiful things of the kind ever offered for public sale. This is not only our own opinion, but that of some of the most expert microscopists of the day, who have testified to the excellence of these slides. For teachers wishing illustrations for their class-teaching, they will be found very acceptable, while to students commencing their histological researches, they will be invaluable, not only for their demonstrating power, but as models to be aimed at as the students themselves become experts in the art.

ANATOMICAL PREPARATIONS. By ARTHUR C. COLE & SON.

Series No. 1. 24 Pathological Preparations, from the Human Subject.

1. Lung, in Phthisis.
2. " Catarrhal Pneumonia.
3. " Croupous "
4. Liver, Amyloid, not universal in lobules.
5. " Cancer.
6. " Cirrhosis, universal in lobules.
7. " Fatty, not " "
8. " Indurated.
9. " Syphilitic, showing fibrous bands at margin.
10. Kidney, Scarlet Fever, Desquamative Nephritis.
11. " advanced Bright's disease, tubes and vessels much distended.
12. Kidney, Fatty degeneration.
13. Kidney, Cirrhosis, showing intertubular fibroid growth.
14. Kidney, Contracted constitutional Syphilis.
15. Spleen, Amyloid (or Sago.)
16. Stomach, Cancer.
17. Hypertrophied Lymphatic Gland from Neck.
18. Schirrus Mammæ, round Cells elongating into Spindle Cells.
19. Uterus, Fibroid Tumor, showing Spindle Cells.
20. Epithelioma of Lip.
21. " " Hand.
22. " " Vulva.
23. Malignant Tumor from Neck.
24. Vascular Tumor of Perinæum.

In case with trays. Objects lie flat, ... $20 00

Series No. 2. 24. Physiological Preparations.

1. Man, Tongue, Transverse Section.
2. " Ileum, " "
3. " Kidney, injected from Artery only.
4. " Kidney, from Artery and Vein.
5. " Skin, Vertical Section.
6. " Brain, cerebellum.
7. " " cerebrum.
8. " Stomach.
9. " Pancreas.
10. " Placenta.
11. " Cuticle, showing hair follicles.
12. " Thyroid Gland.
13. Cat, Ileum, Transverse Section.
14. " Lung.
15. " Brain, Cerebrum.
16. " Tongue, Transverse Section.
17. " Liver, two Colors.
18. " Bladder, Transverse Section.
19. Dog, Stomach of Puppy.
20. Pig, Parotid Gland.
21. Rabbit, Colon, mucous membrane.
22. " Ileum, mucous membrane.
23. " Kidney, from Artery and Vein.
24. " Tongue, Transvere Section.

In case with trays. Objects lie flat, ... $20 00

Series No. 3. 24 Educational Preparations.

1. Adipose tissue.
2. Connective tissue.
3. Yellow elastic tissue.
4. Striped muscular fibre.
5. Unstriped " "
6. Tendon, Long Section.
7. " Transverse Section.
8. Yellow Elastic Cartilage of Cow's Ear.
9. Hyaline Costal Cartilage.
10. Bone, Long Section.
11. " Transverse Section.
12. " Skull, Transverse Section.
13. Scalp, showing hair sha
14. Nerve fibres.
15. " Cells.
16. Skin, Vertical Section.
17. Tooth, " "
18. Capillaries in Pia-Mater.
19. Pigment Cells.
20. Lung of Cat Injected.
21. Liver " "
22. Brain " "
23. Kidney of Rabbit.
24. Ileum "

In case with trays. Objects lie flat, ... $18 00

ANIMAL SUBSTANCES AND ORGANS.

75 cents and $1.00 each. $7.50 to $10.00 per dozen.

Section of Cat's Tongue.
" Human Tongue.
" Toe of White Mouse.
Human Cartilage from Sternum.
" " Fœtal.
Cellular Cartilage in ear of Bat.
Human Tendon (section.)
" Muscular Fibre, involuntary.
" White Fibrous Tissue.
" Yellow Elastic "
" Adipose Tissue.
Striated Ligamentum nuchæ from neck of Giraffe.

Muscular Fibre, (Voluntary).

Mammal—Man.
Bird—Pigeon.
Insect—Blow-fly.
Reptile—Salamander.
Fish—Lepidosiren.

Ultimate Fibrous Structure in Crystalline Lens, Eye of Man.
Crystalline Lens, Eye of Frog, Shark.
Scalp of African Negro, superficial view showing the insertion of hair in tufts. Also, vertical section with the curling of hair at the roots.
Section of Leather, Calf.
" Tanned Skin of Hippopotamus.
Cuticle of Finger, with Perspiration Pores.
Oblique section of Cuticle of Hand.
Sections of an Artery and of a Vein.
Fat Cells from Adipose Tissue.
Hematoidine Crystals in Blood.
Eels from Vinegar and Sour Paste.
Epithelium from Mouth.
Section of Crystalline Lens in eye of Cod-fish.
" Neck of Uterus.
" an Ovary.
" Neck of Bladder.
Salivary Glands from the Tongue.
Sebaceous Glands from Ear.
Palate of Sheep. Vert. Sec.

Blood Discs, (Typical).

Mammalia, from Man. Carnivora, Cat. Ruminantia, Sheep. Rodentia, Mouse. Insectivora, Hedgehog.
Birds, Canary, Passenger-pigeon.
Reptilia, Snake. Amphibia, Frog, Triton.
Cartilaginous Fish, Sturgeon.
Osseous Fish, Salmon.

Pigment Cells, showing the deposit of coloring matter in Skin of African Negro, Sepia pigment in Skin of Cuttle-fish, Caterpillar, Sole, Triton, Frog, Toad, Snake, Eye of Ox, Human Eye, Tail of Shrimp and Hair of Ornithorhynchus paradoxus.

Feathers.

From Emeu, Goldfinch, Hummingbird, Nightingale, Rifle-bird, Australia.

Barbs of Fibrils of Feathers Typical of Structure.

From Wing of Condor, Owl, Emeu, Ostrich.
Down from the Eider-duck, showing transition from Down to Feather.

Scales of Fish.

Cycloid, Carp and Eel.
Ctenoid, Perch and Sole.
Ganoid, Lepidosteus and Section, Sturgeon (section).
Placoid, Dog-fish, Shark.
Epidermis of Saw of Saw-fish.

Spines of Echinodermata.

Acrocladia trigonaria.
Cidaris metulariæ.
Diadema Savignii.
Echinus esculentas, and lividæ.
Echinothrix Petersii.
Echinocidaris purpurescens.
Echinometra lacunter, Heteropora.
Palate of Garden-snail, Cellar-slug, Sepia, Doris bilamelata and tuberculata, Chiton.
Young Crab, 1st Stage.
Cyclops quadracornis (Etomostraca).

Hairs (Superficial View).

From African Squirrel, Albino Mole, English Mole, Beaver (felting surface), Bat, Australian; Bat, Indian; Bat, British; Caterpillar of Tiger-

moth, Caterpillar of Vapor-moth, Bird-catching Spider, Mouse, Brown; Mouse, Shrew; Mouse, White; Mole, Ornithorhynchus paradoxus, Ring-tailed Monkey, Spider-monkey, Reindeer (body) cellular, Reindeer (legs) bristly, Russian Sable, Rat, Wild Rabbit, Squirrel, Sea-mouse, Seal, Falkland Islands, Sea-otter, Falkland Islands Fœtal Hair, Imbricated surface.

Hairs (Transverse Section).

From Head of Man, Ant-eater, Peccary, Eyelash of Whale, Tail of Asiatic Elephant, Tail of African Elephant, Tail of Giraffe, Tail of Hippopotamus, Tail of Rhinocerous, Tail of Siberian Mammoth, Whisker of Wild Cat, Whisker of Lioness, Whisker of Walrus.

SECTIONS OF BONES, TEETH AND SHELLS.

75 cents to $1.00 each. $7.50 to $10.00 per dozen.

Sections of Bones.

Bone of Albatross, Armadillo, Boa-constrictor, Chimpanzee, Crocodile, Eagle, Elephant, Flying-fish, Gorilla, Grampus, Lion, Rhinoceros, Saw-fish, Siluras, Toad, Turtle, Walrus, Whale.

Clavicle (transverse), Human.
Femur (transverse), "
" (vertical), "
Skull, parietal and frontal, "
Earthy Matter of Femur, "
Animal " " "
Fœtal Bone, Femur (transverse), "
" " (vertical), "

A series of (12) *slides, completely illustrating the Structure and Growth of Bone, Cartilage, etc.* $7.50.

Fossil.

Fossil Bone of Man, Mastadon, Irish Elk, Crocodile, Dugong, Ichthyosaurus, Iguanodon, Pterdactyl, Whale, Dinornis giganteus.
Sections of Teeth of Shark, etc.
Bones and Teeth of Fish in situ from Northumberland Coal Shale.
Coprolites, from Lyme Regis.

Sections of Teeth.

From Alligator, Cat-fish, Deer, Dolphin, Dugong, Hippopotamus, Fox, Hare, Horse, Human (various), Myliobatis, Zygobatis, Porcupine, Rhinoceros, Rabbit, Rat, Ox, Saw-fish, Silurus, Sheep, Shark, Sperm Whale, Suis Gigas, Tiger, Wild Cat, Walrus.
Ossification of Pulp cavity in Tooth of Elephant.

Sections of Shells, etc.

Egg of Emeu, Cassowary.
" Ostrich (superficial and vertical).
" Guinea Fowl, Goose.
Pearl Oyster (avicula margaritiicea).
Haliotis splendens.
Pinna marina (vert. sec. and surface).
Crab (vertical and superficial section).
Cyprea annulus, Cerithium atratum.
Meleagrina margaritifera.
Oliva Peruviana.
Ricinula ricinus (long. sec.)
Mitra cucumerina (long. sec.)
Cerithium atratum (long. sec.)
Terebratula Australis.
Orbiculina complanata.
Syderolina Spenglerii.
Foraminifers, in chalk formation (sec.)
Hydrophora rigida " "
Seriatopora hystrix " "
Section of White Coral. Red Coral.
" Pearls from River Tay.

URINARY DEPOSITS AND SPERMATOZOA.

60 and 75 cents each. $6.00 to $7.50 per dozen.

Typical Urinary Deposits.

Uric Acid in normal and in rare forms. In Cirrhosis of Liver, Dysentery, Hepatic Ascites, Pneumonia, Gastric Fever, Hematuria, Acute Rheumatism, Pericarditis, Pleuritis, Gout, Gastralgia, Dyspepsia, Scurvy, Rheumatic Gout, Rheumatic Fever, Rheu-

matic Endocarditis and Perieardiţis, Congestion of Lungs, Gout and Ekzema.
Urie Acid from Boa-eonstrietor.
Urea. Urate of Ammonia. Urate of Soda.
Nitrate of Urea. Oxalate of Urea.
Triple Phosphate Stellate and Rhombic. Also, in Hip-joint disease, Renal Caleulus, General Paralysis, Ulceration of Knee-joint, Catarrh of Bladder, Ramollisement of Brain, Endocarditis of Brain and of Acute Rheumatism, Hepatitis and Syphilitie Hepatitis.
Hippurie Aeid, Typieal form.
Oxalate of Lime, Octohedral form.
" " Dumb-bell form.
Carbonate of Lime, from Man and Horse.
Oxalurate of Ammonia. Murexide. Cholesterine. Sugar of Milk. Sugar in Diabetes, Cystine or Cystic Oxide.
Spermatozoa from Man, Bird, Boar, Elephant, Fish, Mouse, Dog, Horse, Newt, Rat, Rabbit, Hare, Rhinoeeros, Ram, Goat, Camel, Deer, Wolf, Ass.

TOXICOLOGICAL SERIES.

Typical Forms of Poisons.

Animal, Cantharadine from Spanish Fly.
Metallie, Arsenious, Aeid or White Arsenie.
Metallie, Mereury, from Mereurial Vapor.
Metallie, Tartar Emetie or Tartarated Antimony.
Vegetable, Morphine, from Opium.
" Strychnine, from Nux Vomica.

PARASITIC INSECTS, ACARI, etc.

50, 60 and 75 cents eaeh. $5.00, $6.00, and $7.50 per dozen.

Parasites from Bee, Canary, Crow, Curlew, Dog, Fowl, Gull, Eagle, Golden Plover, Humming-bird, Hedgehog, Hog, House-fly, Kestrel, Mouse, Mole, Owl, Ox, Oyster-eatcher, Passenger-pigeon, Rook, Starling, Sheep, Squirrel, Tern, Turkey, Water-rat, Wood-pigeon, Vampire-bat (Calcutta), and British Beetles.
Tiek from Sheep, Hedgehog and Red Deer.
Flea from Bat, Cat, Dog, Fowl, Pigeon, Squirrel, Hedgehog.
Mole's Flea, without Eyes.
Flea (sexes), Pulex irritans.
Cimex lectularius. Sexes.
Aearus of Itch, Sareoptes scabiei, $1.50.
" " Male and Female, $2.00.
" " Male, Female and Larvæ, $2.50.
" " Male, Female, Larvæ and Ovum, $3.00.
Coeeus or Seale Inseet in Skin of Orange.
Aeari or Mites from Ergot of Rye.
Meal-mites.
Book-mite.
House-mite.
Mite from Fur Skins.
Cheese-mites.
Vagrant-mite.
Acari from Rabbit, with Larvæ, $1.00.
Itch Insect from Cat, with Larvæ, $1.00.
Mange Inseet from Horse, Sexes and Larvæ, $1.50.
Faee Inseet, Demodex follieulorum, $1.00.
Crab-louse, Pedieulus pubis, $1.00.
Body-louse, Pedieulus vestimenti, $1.00.
Head-louse (sexes), Pediculus eapitis.
Ovum of Head-louse on hair in situ.
Head-louse (sexes), with Ovum on Hair, $1.50.
Harvest-bug, Trombidium Autumnale, $1.00.
Triehina spiralis, Human, in the Cyst, and separated therefrom.
Triehina spiralis in Pork and Rat.
Head of Cysticereus from Hare.
Cystieerei from Rabbit and Pike-fish.
Aseari and Tœnia from Lion and other animals.
Sareina ventrieuli, Human.
Echinoeoeei from Cyst and Ova.
Pro-glottis of Tœnia solium (sexual organs).
Entozoa from Cuttle-fish, and from Horse.
Parasites from various Fish.

SPICULA FROM ZOOPHYTES, SPONGES, etc.

50, 60 and 75 cents each. $5.00, $6.00 and $7.50 per dozen.

Aleyonium digitatum.
Spongilla Meyeni, Ceylon.
" plumosa, Bombay.
Glass Rope Sponge (Hyalonema mirabile).
Geodia Baretti. Grantia compressa.
Hymedesmia Johnsoni.
Haliehrondria Griffithsii.
Pachymatisma Listeri.
Tethia cranium. Tethia lyncurium.
Gemmules of Sponge Geodia.
Section of Smyrna Sponge.
British Spongilla and Spongilla Meyeni, with Spicula in situ.
Fibres from Euplectella speciosa.
Spines of Spatangus.
Spicula of Gorgonias, various.
Ambulaeral disks from Echinus.
Plates and Hooks (Astrophyton Linkii)
" " Synapta (digitata).
" " Synapta (inhærens).
Wheel Plates, Chirodota (violacea).
" " " (inhærens).
Cutaneous plates (Holothuria edulis).
" " Holothuria (floridana).
" " (from Tongataboo).
Spicules of Xenia.
" Renilla Americanus.
Spines of Brissiopis.
" Young Star-fish.
Star-fish.
Seven-Pointed Spicules of Sponge.

FORAMINIFERA AND POLYCISTINA.

60 and 75 cents each. $6.00 and $7.50 per dozen.

Foraminifera, Adriatic Sea.
" Bay of Bengal.
" The Levant.
" The River Nene.
" The Red Sea.
" Cuxhaven.
" Gulf Stream, 2000 fathoms.
" Samoa.
" Campeachy Bay.
" Zanzibar.
" St. Vincent, Australia.
Foraminifera, Indian Ocean, 2200 fathoms.
" Persian Gulf, 504 fathoms.
" Coast of Malabar, 188 "
" Atlantic Ocean, 2 miles.
Polycistina, Barbadoes.
" Bermuda.
" Nicobar.
" Nankoori.
" Mondaino, Italy.
Specimens collected by The Challenger Expedition, through Dr. Carpenter.

DIATOMS, RECENT AND FOSSIL.

50 and 60 cents each. $5.00 and $6.00 per dozen.

Holderness and Ormesby, Yorkshire.
Keswiek, St. Bees and Torquay.
Isles of Arran, Ramsay and Mull, Scotland.
Peterhead, Premnay Peat and Caithness.
Parish of Logie, Coldstone, Aberdeenshire.
Mourne Mountain, Med Combre, Stonyford and Toome Bridge, Ireland.
Dolgelly in North Wales.
Bergmehl from Sweden and Lapland.
Edible Fossil earth from Java.
Sodertelge, Christianstadt and Badeschlam, Sweden.
Ringkjobing and Isle of Mors, Jutland
Tripoli, or Polirschiefer from Bilin, Bohemia.
Eger and Franzenbad, in Bohemia.
Keiselghur, Germany.
Berlin.
Lüneberg in Hanover.
Oran in Algeria.
Baldjik in Turkey.
Santa Fiore and Leghorn.
Sicily, Moron and the Coast of Spain.
Kiel on the Baltic. Cuxhaven, North Sea.
Salt Marshes on the Coast of Holland.
California. Isle of Elide. Mexico.
Old Iehaboe, 1844. New, 1860.
Lobos de Tierra. Canary Islands.

Coast of Cherbourg.
Cambridge Estate in Barbadoes.
Cornwallis, Nova Scotia.
Calvert County, Maryland.
New Nottingham Deposit, Md.
Herring Bay, Nottingham, "
Cherryfield and Monmouth, Me.
Perley's Meadow, South Brighton, Mass.
Duck Pond and French's Pond, Mass.
Richmond, Virginia.
Sing Sing on Hudson River.
Utah, Great Salt Lake.
Goose Lake, Michigan.
Greenwich, Connecticut.
Charleston, South Carolina.
River Fernandina, Florida.
Holland Cliff, Marlborough.
Shokoe Hill and Bangor.
Monticello.
Colon and Rio Janeiro, South Ameriea.
San André, Mexico.
Monterey Bay and Los Angelos, California.
The Harbor, Hong Kong.
Yarra Yarra River, Australia.
The Western Coast of Australia.
Lamplough, in South Australia.
Santa Monico, California.
Saldannah Bay. Chincha Islands.
St. Helena. Lower Peruvian. Patos.
Bolivia. New Peruvian, 1862.
Guanapee Island. Bay of Mejillones.

And many hundreds more from all parts of the world. The assortment is constantly being added to so that it is only possible to name a few prominent localities.

SELECTED DIATOMS.

60 cents each. $6.00 per dozen.

Achnanthes longipes.
" subsessilis.
Actinocyclus Ralfsii.
Actinoptychus splendens.
Actinoptychus undulatus.
Amphiprora alata.
Amphitetras antediluviana.
Amphora laevis.
Arachnoidiscus ornatus.
Aulacodiscus Crux.
Auliscus sculptus.
Biddulphia laevis.
" pulchella.
" rhombus.
Campylodiscus limbatus.
Campylodiscus Echineis.
Campylodiscus Clypeus.
" spiralis.
Climacosphenia moniligera.
Ceratoneis Arcus.
" lunaris.
Cocconeis placentula.
" Pediculus.
" Scutellum.
Cocconema Cistula.
Cocconema lanceolatum.
Colletonema vulgare.
Coscinodiscus Oculus Iridis.
Coscinodiscus radiatus.
Cyclotella Meneghiniana.
Cylindrotheca gracilis.
Cymatopleura Solea.
Cymbella amphicephala.
" affinis.
" gastroides.
" helvetica.
" ventricosa.
Diatoma elongatum.
" vulgare.
Endostaurum Cruzigerum.
Epithemia constricta.
" gibba.
" Hyndmannii
" turgida.
Eunotia undulata.
Eupodiscus Argus.
Fragilaria intermedia.
" minima.
" vireseens.
Gephyria media.
Gomphonema acuminatum.
" commune.
" geminatum.
" gracile.
" robustum.
" olivaceum.
Grammonema striatulum.
Homoeocladia Martiniana.
Isthmia enervis.
Licomphora Pappeana.
Mastogloia Braunii.
Melosira arenaria.

Melosira Borrerii.
" crenulata.
" nummuloides.
" varians.
Meridion circulare.
" constrictum.
Navicula Carassius.
" Clepsydra.
" didyma.
" Entomon.
" nobilis.
" major.
" gibba.
" gibba forma gracilis.
" mesolepta.
" oblonga.
" radiosa.
" amphisbaena.
" serians.
" hemiptera.
" slesvicensis.
" sphacrophora.
" splendida.
Nitzschia amphioxys.
" hungarica.
" media.
" obtusa.
" sigma.
Nitzschia Schweinfurthii.
Odontidium hiemale.
Odontodiscus subtillis.
Pleurosigma acuminatum.
Podosira maculata.
Pyxidicula cruciata.
Rhabdonema adriaticum.
" arcuatum.
Rhoicosphenia curvata.
Schizonema Grevillei.
Scoliopleura tumidum.
Solium exculptum.
Stauroneis gracilis.
" lanceoltata.
" Phoenicenteron.
Stephanodiscus Niagarae.
Surirella striatula.
Synedra affinis.
" familiaris.
" capitata.
" pulchella.
" tabulata.
" splendens.
Tabellaria fenestrata.
" flocculosa.
Terpsinoë musica.
Triceratium membrauaceum.
Toxonidea insignis.

With hundreds of others. Assortment constantly chauging.

TEST DIATOMS.

Mounted Dry or in Balsam, as preferred.

75 cents each. $7.50 per dozeu.

Amphipleura pellucida.
Cymatopleura elliptica.
Fragilaria capucina.
Frustulia saxonica.
Navicula cuspidata.
Navicula rhomboides.
Grammatophora marina.
Grammatophora subtillissima.
Hyalodiscus subtilis.
Hyalodiscus Stelliger.
Nitzschia sigmoidea
Nitzschia obtusa var. scalpelliformis.
Pleurosigma angulatum.
" attenuatum.
" acuminatum.
" aestuarii.
" balticum.
" formosum forma gigantea.
" Hippocampus.
" Spencerii.
Rhizosolenia styliformis.
Striatella unipunctata.
Surirella Gemma.
Triceratium favus.

MÖLLER'S DIATOMACEEN AND OTHER TYPEN PLATTES.

951. Möller's Diatomaceen Typen Platte, No. 1, is a slide of the usual size—three inches by one inch—comprising about 500 Diatoms (correctly 392 distinct species and varieties), being acknowledged types of Seventeen Genera of the Order Diatomaceæ. The shells are arranged in four quadrangles, each formed

of six lines, and each line containing about sixteen species, presenting a figure of the following form:

I.	II.
1	1 .....
2	2 .....
3	3 .....
4	4 .....
5	5 .....
6	6 .....

III.	IV.
1	1 .....
2	2 .....
3	3 .....
4	4 .....
5	5 .....
6	6 .....

The Diatoms are prepared in the best manner, mounted in Balsam, *absolutely pure and clean*, while the integrity of each and the symmetry of the whole may be said to be as perfect as possible.

Easy reference to each member is afforded by an accompanying Printed Catalogue, by which the name of any individual Diatom on the slide may be learned; or any name in the Catalogue as easily identified with its corresponding shell on the slide.

The classification is that of Herrn A. Grunow, of Berndorf, near Wien.

To the name of each Diatom is appended, its nature, whether fossil or recent, its origin, whether marine or from brackish or fresh water, its geographical locality, with the name of the naturalist who assigned its nomenclature.

On the whole it is a marvelous production of human skill and unceasing perseverance, a wondrous example of accurate manipulation and delicacy of touch, exciting the admiration of all who see it. To the Naturalist and Student it forms a Cyclopædia of reference, which may be long and repeatedly studied, with untiring interest and returning freshness. It is worthy of a place in the cabinet of every advanced Microscopist.

Price, in morocco case, with bound Catalogue, ... $30 00

952. Möller's Diatonaceen Typen Platte, No. 2, is a smaller collection of One Hundred Diatoms, by the same artist, arranged on the same plan in one quadrangle, accompanied by a printed Catalogue, and quite equal in quality to the larger collection. Price, . . . 12 00

953. Möller's Diatomaceen Typen Platte, No. 3, is similar to 952, but has the name of each Diatom photographed beneath it, so that specimen and name can be seen at one view. Price, . . . 13 50

954. Möller's Diatomaceen Probe Platte is a collection of 20 Diatoms, by the same artist, arranged in a single line, on a slide of the usual size—3x1 inch—in Balsam, and graduated, according to their value as test objects. In a neat morocco leather case, with descriptive list. Price, ... 6 00

955. Möller's Diatomaceen Probe Platte, the same as 954, but mounted dry. Price, ... 7 50

956. Möller's Typen Platte of the Holothuridæ, containing 34 species, mounted on a slide of usual size—3x1 inch. In morocco case, with descriptive Catalogue. Price, ... 15 00

957. Möller's Typen Platte of the Echinoidea, on slide 3x1 inch. In morocco case, with Catalogue. Price, ... 7 50

NOBERT'S BANDS OF TEST LINES.

We receive direct from M. Nobert, of Pomerania, his exquisitely fine Bands of Lines, ruled on glass, as described in a communication to the *American Naturalist*, April, 1868, reprinted in the *Quarterly Journal of Microscopical Science*, October, 1868, p. 131, and referred to in Dr. Carpenter's *Microscope and its Revelations*, fourth edition, London, 1868, p. 180.

"The mathematical certainty with which the distance of these lines may be ascertained, and the regular gradation of the series they present, gives to M. Nobert's Test Plate a very high value for the determination of the relative merits of achromatic objectives, of that class at least in which angular aperture and definition are of the first importance.—*Carpenter on the Microscope, fourth edition.*

Slide, 3x1 inches, in morocco case, ... $50 00

MISCELLANEOUS TEST OBJECTS.

60 and 75 cents each. $6.00 and $7.50 per dozen.

Scales of Lepisma saccharina, Podura plumbea.
" Lepidocyrtus curvicollis, the Original by the late Richard Beck.
" Greenhouse Degeeria, Templetonia nitida, Macrotoma major, Petrobius maritimus.
" Meadow Brown—Hipparchia janira.
" White Cabbage(large)—Pontia brassica. Do. (small)—Pieris rapæ.
" Green Forester—Procris statices.
" Azure Blue—Polyomatous argiolus.
Scales of Brazilian Blue—Morpho menelaus.
" Brazilian Amathusia Horsfieldii, Cloth-moth—Tinea vestimenti, Gnat—Culex pipiens, dry.
Wing of Gnat, in balsam and dry.
Hair of Indian Bat, Australiau Bat, Indian Mouse, Larva of Dermestes.
Proboscis of Blow-fly. Pygidum of Flea.
Ultimate Fibrous Tissue of Muscle of Pig (Powell's Test). $1.00.
Disk of Deal (Dr. Carpenter's Test for Achromatism).
Section of Spine of Echinus (Dr. Carpenter's Test for Flatness of Field). $1.00.

SECTIONS OF MINERALS, COALS AND FOSSIL WOODS.

75 cents and $1.00 each. $7.50 to $10.00 per dozen.

Minerals.

Moss Agates, various.
Basalt — Giant's Causeway, Fingal's Cave, Staffordshire.
Carbonate of Lime. Stalactite.
Flint, with various organic remains, Spicules, Sponges, Corals, Xanthidia (or Sporangio), and Shells.
Granite from Aberdeen, Peterhead, Killarney, Ireland, Guernsey, "Greenland's Icy Mountains," Cornwall, Cheesewring, Greywacke from Labrador.
Syenite from Mount Sorrel, Sarcophagus in Gt. Pyramid.
Limestone, Nummulitic—foundation of the Great Egyptian Pyramid.
Limestone, St. Vincent's Rock.
Limestone, Magnesian, Dudley; Mountain, Scotland; Upper Silurian, Dudley; Oolitic, Clifton and Bath, Encrinital Marble, Foundation Stone of Old Blackfriars Bridge, Himalaya Mountains, Lyme Regis and Portland, Niagara Falls.
Many of the above contain interesting organisms — Foraminifera, Echini, Shells, Coral, Spicules, Nummulites, etc., etc.
Lapis lazuli. Lepidolite.
Madrepores, various.
Black Marble.
Encrinital Marble, Derbyshire,
Marble, Carrara, Temple of Ephesus.
Green Malachite from Russia.
Blue Malachite from Australia.
New Red Sandstone, Cumberland

Old Red Sandstone, Scotland.
Pitch-stone, Isle of Arran.
Red Porphyry, Egypt.
Brown Porphyry, Sweden.
Heliotrope, Blood-stone.
Sun-stone.
Serpentine, Red and Green.
Water Cells in Quartz Rocks from Norway and Mont Blanc.
Various Organisms from the Chalk, Chalk Marl and Gault.

Sections of Coal.

Transverse, Vertical and Radial.

Derbyshire, Newcastle, Yorkshire, Scotland, China, Australia, America, Heraclea on the Black Sea, Tertiary Coal, Bovey Tracey.
Cannel or Parrot Coal.
Torbane Hill Coal.
Sections of Jet (Whitby).

Sections of Fossil Wood.

Endogens from Antigua, etc.
Palm, vertical and transverse.
Palm, from West Indies and Ceylon.
Fern, stem and root.
Conifers and Exogens from Derbyshire, Portland, Lough Neagh. Unknown forms from Lancashire Coal.
Fibrous Fossil Wood, Egypt.
Opalized Wood, Tasmania.
Fossil Sponge.
Fossil Coral, Acervularia pentagona.
Pentacrinus basaltiformis.

WHOLE INSECTS, etc.

50 cents to $1.50 each.

Aphis rosæ, buxi and others.
Ant, Formica rufa and others.
Blossom-fly, Anthomyia pluvialis.
Bronze-fly, Pachygaster ater.
Biting Field-fly, Stomoxys calcitrans
Biting (Clegg) Fly, Hæmatopata pluvialis.
Black-tip Fly, Ortalis vibrans.
Cattle-fly, Musca corvina. Bombilus major.
Corn-fly, Empis livida. E. stercorea.
Crane-fly, Tipula oleracea.
Dunghill-fly, Spherocera subaltans.
Dung-fly, Scatophaga merdana and others.
Drone-fly, Helophilus pendulus.
Flirt-fly, Sepsis punctum.
Fantail-fly, Dolichopus Æneus.
Fungus-fly, Mycetophila, various.
Gnat, Culex pipiens (Sexes), the Male.
" Window, Rhyphus fenestralis.
" Ringed, Culex annulatus.
" Plumed, Chironomus plumosa.
" Winter, Trichocera hiemalis.
" Wood, Sciara brunipes.
Grass-fly, Opomyza germinationis.
Hairy-fly, Bibio Marci, B. Johannis.
Hawk-fly, Dioctria rufipes.
Herbage-fly, Platypalpus fasciatus.
His grace, Calobata petronella.
House-fly, Musca domestica.
Ichneumon-fly, Ophion luteum.
Lace-Wing Fly, Chrysopa perla.
Leaf Insect, Phyllophorella acerina.
Mayflower-fly, Dilophus.
Merrydancer, Hilara maura.
Mosquito, Culex Mosquito, various.
Midge, Psychoda.
Mud-fly, Borborus longipennis.
Marsh-fly, Tetanocera aratoria.
Marsh Carne-fly, Phycoptera.
May-fly, Ephemera vulgata.
Nettle-fly, Platystoma seminationis.
Pearl-fly, Sialis lutarius.
Scorpion-fly, Panorpa communis.
Shadow Watcher, Syritta pipiens.
Snipe-fly, Leptis scolopacea.
Snout-fly, Rhingea campestris.
Saw-fly, Allantus scolopacea.
Thrips, Phlæothrips coriaceus.
Vinegar-fly, Drosophila cellaris.
Unicorn-fly, Odontocera denticornis.
Wasp-fly, Syrphus ribesii.
Window-fly, Phora rufipes.
Centipede, Lithobius forcipatus.
Millipede, Geophilus electricus.
Skin of Caterpillar, many species.
" Silkworm, Bombyx mori.
Corn-bug, Miris erraticus.
Cuckoo-spit, Aphrophora spumaria.
Collared Florist, Anthobium torquatum.
Cardinal-beetle, Pyrochroa rubens.
Beetle, Cercopsis sanguinolenta.
Earwig, Forficula auricularia.
Frog-hopper, Amblycephalus viridis.

Grasshopper, Locusta viridis.
Glow-worm, Lampyrus noctiluca. (Sexes.)
Grass-flea, Thyamis femoralis.
Lady-bird, Coccinella variabilis, etc.
Parsnip-beetle, Anaspis melanopa.
Pond-beetle, Lactophilus minutus.
Mud-beetle, Hyphydrus ovatus.
Marsh-flea, Delphax lineata.
Raspberry-beetle.
Soldier-beetle, Telephorus melanurus.
Sailor-beetle, Halipus lineatoeollis.
Scissor-bug, Capsus planicornis.
Thistle-beetle, Crepidodera ferruginea.
Wood-beetle, Leptura levis.
Water-beetle, Hygrotus elegans.
Water-bug, Corixa fossarum.
Water-boatman, Notonecta glauca.
Water-scorpion, Nepa cinerea.
Pond-skater, Gerris lacustris.
Ditch-skater, Velia rivulorum.
One-Clawed Water-bug, Naucoris cimicoides.
Tingis, Larva, Pupa, Imago, various.
Pseudo Scorpion, Chelifer cancroides.
Earth-mite, Trombidium.

Spiders.

Bush-spider, Agelena nava.
Garden-spider, Epeira diadema.
Ground-spider, Lycosa agrestica.
House-spider, Aranea labyrinthica.
Harvest-spider, Phalangium cornutum.
Hunting-spider, Drassus lucifergus.
Shepherd-spider, Opilio.
Water-spider, Argyroneta aquatica.
Water-wolf, Lycosa aquatica.

Larvæ and Pupæ.

Pupa of Water-boatman.
Larva of Ant-lion, Myrmelio formicarius.
" Cardinal-beetle, Pyrochroa coccinea.
" Dragon-fly, Ermine-moth.
" May-fly, Lace-Wing Fly.
" Water-beetles, various.
" and Pupa of Gnat. In Fluid.
" Flea, House and Blow-fly
" Bot-fly in Egg, on hair of Horse.
" Staphylinus, Devil's Coach-horse.
" Lady-bird, Coccinella, also Pupa.
" Click-beetle (Wire-worm).

About twice the number of Species here named are usually in Stock, and the Sexes of some can be supplied.

PARTS OF INSECTS.

50 and 60 cents each. $5.00 and $6.00 per dozen.

Antennæ of Cockchafer, sexes, House-fly and Blow-fly, Moths, Gnat, sexes.
Head of Butterflies and Moths, Crane-fly, Gnat, Mosquito (Lancets), Cock-chafer, Crane-fly, Dragon-fly, House-fly, Humble-bee, Butterfly.
Beetle, prepared to show multiplied images reflected from facets of Cornea.
Gizzard of Dytiscus, Grasshopper, Katydid, Cricket, Flea.
Stomach of Beetle, Blow-fly.
Foot of Caterpillar.
Leg and Foot of Blow-fly, Drone-fly, Dung-fly, Dytiscus, Frog-hopper, Gyrinus, Honey-bee, Hawk-fly, Hornet, Ophion, Pearl-fly, Saw-fly, Spiders, various, Wasp.
Mouth and Jaws of Wasp, Spiders.
Feathered Oar of Corixa, Dytiscus.
Expanding Paddle, Gyrinus.
Lancets of Flea, Bed-bug, Gad-fly, Mosquito, Gnat.
Ovipositor of Cuckoo-spit, Katydid, Cricket, Crane-fly, Blow-fly, Drone-fly, Dragon-fly, Saw-fly, Frog-hopper, Corn-bug.
Proboscis or Tongue of Butterfly and Moth, Honey-bee, Humble-bee, Blow-fly, House-fly, Cricket, Hawk-fly, Drone-fly, Rhingia.
Reproductive Organs, Male Wasp, Hornet.
Scales from Wings of Death's-head Moth, Oak-egger, Cloth-moth, Paris Butterfly, Fritillary, Giant Silk-moth, Japan, and many others.

Spinneret of Silkworm, Garden-spider.
Skin of Caterpillar, Chrysalis, Silkworm, Garden-spider.

Spiracles of Blow-fly, Drone-fly, Cockchafer, Dytiscus, Privet Caterpillar.
Sting of Bee. Hornet. Wasp.
" With poison gland. $1.00
Tail of Dolichopus Æneus.

Tracheæ of Silkworm, Blow-fly, and ultimate ramification in stomach of Bee, $1.00, in nerves of Caterpillar, $1.00. Intestines of Blow-fly.

Halteres of Crane-fly, Rhingia, Drone-fly, Blow-fly.

Wings of Bee, with hooklets, Hornet, with hooklets, Wasp, with hooklets, Blow-fly, Butterflies, various, Moths, various, Mosquitos.

Elytron of Corixa fossarum, Water-beetles, various.
Winglet of Blow-fly.
Anatomy of the Blow-fly 12 Slides in a box, $6.00.

OPAQUE AND BINOCULAR OBJECTS.

60 and 75 cents each. $6.00 and $7.50 per dozen.

Whole Insects, etc.

Tingis arcuata.
Beetles and Weevils, various.
Cicada from Maryland.
Gall-fly, Typhloryba uloni.
Asparagus-beetle. House-fly.
British Diamond-beetle.
Eggs of Insects, various; Parasite of Pigeon, Hornbill, Larvæ of Oak-egger.
Eyes showing facets, from Beetle, House-fly, Butterfly, Moth, Wasp, Dragon-fly.
Eyes of Garden-spider.
Aphis piereed by Ichneumon-fly.
Legs of Dytiscus marginalis.
Heads and Parts of Beetles.
Cyphus germari.
Cicindela sylvatica.
Eustales adamantinis.
Chrysolophus.
Cureulio imperialis.
Eupholus.
Hypomeces squamosus.
Golden girdle.
Exuvium of Myriapoda, Polyxenus.
Wing of Magpie-moth, Butterfly, Azure Blue; Cloth-moth, Vaporer; Alexis, Clouded Yellow; Fritillary, Morphomenelaus, Paris, Peacock, Copper, Tortoise-shell, Red Admiral.

Palate of Halictis tubereulata, Limpet, Patella vulgaris; Periwinkle, Littorina littoralis; Troehus zizyphinus, Whelk, Buccinum undatum; Gizzard of Cricket.
Foraminifera, from Adriatic Sea, Bay of Bengal, Levant, River Nene, Caxhaven.
Polycystina, Barbadoes, various.
Fossil infusoria.

Vegetable.

Leaf of Deutzia, Nettle, with Stings, Elæagnus, Onosma taurica, Alyssum Olympicum.
Skeleton Leaf of Box-tree and Indian Ivy.
Section of Leaf of Orchid, Stem of Clematis, Sugar-cane, Shell of Mexican Gourd, Pith of Rice Paper-plant.
Spores of Quill-wort, from Cashmir.
Seeds of Antirrhinum, Poppy, Henbane, Lobel's Catchfly, Orchis, Portulaca.
Pollen of Hollyhock, Mallow, Portugal Pine, Geranium, Passion-flower, Lily, Scotch Fir.
Peristomes of Mosses, many species.
Funaria hygrometrica, mounted in a cell for Hygrometric experiment.

Polyzoa, Corallines, etc.

Anguinaria spatulata.
Bicellaria ciliata. B. grandis.
Bugula avicularia.
Catenicella plagiostoma.
Cellularia avicularis.
Crisea eburnea. Flustra foliacea.
Membranipora pilosa.
Notamia bursaria.
Sertularia opercularia.
Diatomaceæ on Sea-weed, in situ.
Gemmules of Sponge.
Hairs of Peccary, sections.
Isthmia nervosa and enervis.

Orthosira arenaria.
Shell of Orbitolite.
Spines and Shell of Spatangus.
Spicules of Gorgonias.
Young Oysters.
Feathers of Humming-birds, Lovebird, Peacock, Rifle-bird, Australia.
Skin of Sole, Dog-fish, White Shark.
Brittle Star-fish.
Sun Star-fish.
Bones of Ophiocoma rosula.
Pedicellaria of Echinus sphæra, Echinus esculentus, Uraster rubens.
Spines of Palmipes membranaceus.
Sponge with Spicules, in situ.
Spider-crab.
Mantis Shrimp.

Opaque Minerals, etc.

Avanturine (artificial). Hypersthene.
Antimony, Needle form. Red, Oxysulphuret.
Crystals of Berberine, Picrotoxine.
Oxalate of Lime. Crystalline Indigo.
Bismuth. Sulphuret of Iron.
Crystalline Oxide of Lead, Lead Ore.
" Silver, Electro deposit.
Native Gold from Peru, Natal and Persia.
Gold Nuggets, California.
" Dust, British Columbia.
" Sand with Quartz, Australia.
" Leaf transmitting Green Light.
" Pure and Brilliant. Mosaic Gold.
Fibrous or Moss Copper, Nat. formation.
Granular Copper Ore, South America.
Peacock and Ruby Copper.
Iridescent Oxide of Lead. Pure Iridium.
Crystals of Titanium, from Blast Furnace.
Crystalline Lava, from Mount Vesuvius.
Decomposed Glass from Pompeii.
Sand or Dust from Eruption of Vesuvius, 1872.
Mysterious Dendritic spots on Writing Paper.

POLARISCOPE OBJECTS.

50 and 60 cents each. $5.00 and $6.00 per dozen.

Chemical Crystals.

Asparagine.
Aspartic Acid.
Bitartrate of Ammonia.
Borax. Boracic Acid.
Carbozotate of Potash.
Carbonate of Lime, from Horse.
" " Boa-constrictor.
Creatin. Cholesterin.
Chlorate of Potash.
Chloride of Barium.
Cinchonine.
Cinchonidine.
Citric acid.
Ferri-cyanide of potassium.
Iodide of Potassium.
Iodo-disulphate of Quinine.
Murexide (Dichromatic).
Naphthaline.
Nitro-prusside of Sodium.
Oxalate of Lime.
Oxalate of Ammonia.
Oxalate of Chromium and Potash.
Oxalic Acid.
Oxalurate of Ammonia.
Platino-cyanide of Magnesia.
" " Barium.
Platino-cyandie of Thallium.
Pulmose Quinidine.
Quinidine. Santonine.
Salignine. Salicine.
Strychnine. Sugar.
Sulphate of Cadmium.
" Nickel and Potash.
" Copper.
" Spiral form.
" Copper and Magnesia.
Tartaric Acid.
Thionurate of Ammonia.
Triple Phosphate, various forms.
Urea. Uric Acid.
Uric Acid from Boa-constrictor.
Wine Crystals.
Bitartrate of Potash.

Animal Substances.

Palate of Haliotis tuberculata, Limpet, Patella vulgaris, Nassa reticulata, Periwinkle, Trochus zizyphinus, Whelk.

Claw of Ourang-outang, Lynx, Sloth, Lioness, Wild Cat, Fowl, Polar Bear, Seal.

Finger Nail—Human. Cuttings.
Toe Nail, Transverse Section.
Corns of Elephant.
" Human.
Foot-Pad of Dromedary, Cat.

Hoof of Antelope, Elk, Pig, Ox, Mustang, Reindeer, Zebra.

Horn of American Bison, Antelope, Brahmin Bull, African Rhinoceros, Indian Rhinoceros.
Quill of Porcupine.
Whisker of Walrus.
Spines of Hedgehog.
Cat's Tongue.
Section of Cat's Tongue, Nose and Lip.
Bone of Cuttle-fish.

Whalebone, Finland Whale, Bottle-nose, Beluga Catodon.
Embryo Oysters.
Exuvium of Prawn.
Teeth of Medicinal Leech.
Tendon Achilles, Human.
Tendon of Ostrich.
Leg of Dytiscus.
Elytron of Dytiscus.

POLARISCOPE OBJECTS.

Animal Substances.

Skin, Human (vertical section), Negro Scalp, with incipient Curl in Roots of Hair, Alligator, the Nile, Giraffe, with Hair, Lip of Calf, with Hair, Lip of Cat, with Hair, Nose of Cat, Eel, with Scales in situ, Sole, with Scales in situ, Synapta, Anchors in situ.
Scales of Carp, Eel, Perch, Sole, Gudgeon and Mullet.
Tail of Whitebait.
Crystals of Carbonate of Lime, in Tail of Prawn and Shrimp.
Plates from Skin of Holothuria.
Anchors, etc., from Synapta.
Hair, Human, White with Age, Roots and Eyebrows, Shavings of Beard, Albino Girl, Infant, Young Lady's Eyelash, Gorilla, Brahmin Bull, Reindeer, Polar Bear, White Mouse, Persian Cat, Angora Goat, Mohair, Elephant's Tail, section.

Stones and Minerals. 75 cts. to $1.

Actinolite. Avanturine.
Agates, various.
Asbestiform Serpentine.
Carbonate of Lime.
Carrara Marble.
Gibraltar Rock.
Granite, various localities.
Labrador Feldspar.
Jasper with Amethyst.
Quartz Rock, various.
Quartsite, Mount Blanc.
Satin Spar. Sandstone.
Selenites, various colors.
Sulphate of Baryta.
Zeolite from Giants' Causeway.

Polariscope Objects Moving in Fluid.

Animal Substances Mixed.
Actinolite.
Brazilian Pebble Fragments.
Crystalline Sulphate of Lime.
Fibrous Sulphate of Lime.
Rolling Stones, various.
Young Oysters.

Vegetable Substances.

Starch from Arrowroot, Calebar Bean, Colchicum autumnale, Potato, Oats, Rice, Sago, Palm, Tapioca, Tous les Mois, Ginger, Maize, Barley, Wheat.
Section of Potato, Starch in situ.
Cuticle of Leaf of Correa cardinalis, Deutzia scabra, Elæagnus, Onosma taurica.

Silicious Cuticles—From Araucaria imbricata, Bamboocane, Sugar-cane, Equisetum arvense, Dutch Rush, E. hyemale Indian Corn, Canary-seed, Husk of Rice Grain, Straw of Rice, Leaf of Wheat.
Fibro Cells from Ærides roseum, Oncidium bicallosum.
Scalariform vessels from Fern, Dicksonia Antarctica.
Spiral vessels Rhubarb.
Fern Scales, Cheilanthes Eckloniana, Elaphoglossum squamosum, Nothochlæna maranta, Nothochlæna lævis.
Stellate Hairs from Elæagnus.
Wing of Seed of Eecremocarpus.

Vegetable Fibres in Balsam.

Cotton. China-grass.
Flax from Ireland and New Zealand.
Hemp, Russia and Manilla.
Jute Fibre, Calcutta.
Silk, Indian, Chinese.
Silk, Italian, British.
Wool, British, Australian.
Pyroxylin (Gun Cotton).
Shoddy Fibre.
Genuine Crinoline.
Indian Muslin (Woven Wind).
Pine-apple Muslins, Philippines.
Finest French Cambric, $10.00 per yard.

Scales from Ferns.

Cheilanthes Eckloniana, C. elegans, Ceterach officinarum, Goniophlebium sepultum, Niphobolus lingua, Nothochlæna lævis, Nothochlæna crassifolia, N. maranta, Elaphoglossum squamosum.
Raphides in Cactus, Garlic, Hyacinth, Onion, Pear, Rhubarb, Water-lily.

ALGÆ, DESMIDIACEÆ, FUNGI, etc.

60 and 75 cents each. $6.00 and $7.50 per dozen.

Algæ, Hepaticaceæ, Desmidiaceæ, Muscaceæ.

Batrachospermum moniliforme. B. tenuissimum.
Draparnaldea plumosum. Chætophora.
Spirogyra. Hydrodictyon. Rhozoclonium.
Sphagnum cuspidatum in Leaf and Sections.
Sphagnum cymbifolium.
Hypnum abietinum and prælognum.
Frullania dilatata. Mnium cuspidatum.
Jungermania hyalina. Trichocolea tormentilla.
Lepidozia reptans. Lophocolea bidentata.
Micrasterias rotata. Volvox globator.

Marine Algæ, Corallines, Polyzoa.

Bicellaria grandis. B. tuba.
Calithamnion corymbosum and refractum.
Calithamnion diaphnum. C. roseum.
Ceramium cilliatum. C. pellucidum.
Ceramium botryscarpum. C. diaphnum. C. acanthonotum.
Dasya coccinnea.
Ectocarpus fasciolatus.
Flustra avicularis. Griffithsia setacea.
Notamia bursaria.
Thoa benii. Thoa nalecina.
Cladophora rupestris. Ballia callitricha.
Polysiphonia parasitica. P. Brodiei.
" bissoides. P. fibrillosa.
" fibrata. P. fastigata.
Plocamium vulgare.
Ptilota plumosa and elegans.

Capsules and Spores of Mosses.

Bryum capillare. Dicranum scoparium.
Hypnum rutabulum. Tortula unguiculata.
Funaria hygrometrica. Ovary in section.

Thecæ and Sporules of Ferns.

Pteris aquilina, Polypodium, Osmunda regalis.

Fungi, Blight, Mould, Mildew.

Smut in Ear and Grain of Wheat.
Bunt fungus in Corn grains; Uredo fœtida.
Rust or Corn Mildew, Puccinia graminis.
Red Rust, Trichobasis rubigo-vera.
Eels in Wheat, Vibrio tritici.
Timber fungus, Arcyria nutans.
" " Stemonitis fusca.
Spiral fungus, Trichia chrysosperma.
Star fungus, Asterosporium Hoffmanii.
Chain-brand, Xenodochus carbonarius.
Mould from Jam, Aspergillus umbellatus.
Fungus on Pepper Plant, Aspergillus candidus.
Spores of Yeast Plant.
Section of Truffle, Tuber cibarium.

VEGETABLE PREPARATIONS.

60 and 75 cents each. $6.00 and $7.50 per dozen.

Sections of Woods, Stems, etc.

The number 3 indicates that Three Sections of Stems are on one Slide, Transverse, Vertical and Radial.

Arancaria excelsa, 3.
Apple-tree, Pyrus malus, 3.
Asparagus, Asparagus officinalis.
Aristolochia sipho, Ornithocephalus.
Baobab-tree, Adansonia digitata.
Berberry, Berberis vulgaris
Beech, Fagus sylvatica, 3.
Brake-fern, Pteris aquilina.
Brava, Cissampelos Pereira.
Burdock, Aretienm lappa.
Butcher's Broom, Ruscus aculeatus.
Cane, Bamboo, 3.
Bambusa, 3, Malacca, Calamus scipionum, Rattan, Calamus rotang, 3, Sugar, Saccharum officinarum, 3, Wanghae.
Catalpa syringæfolia, 3.
Cedar of Lebanon, Cedrus Libanus, 3.
Cherry-tree, Cerasus communis, 3.
Cinnamon, Cinnamonum Zeylanicum.
Chili Pine, Araucaria imbricata, 3.
Cocoa-nut Palm, Cocus comosa.
Cork-tree, Quercus suber, 3.
Cutleya Leopoldii,
Dendrobium nobile, speciosum.
Dog-rose, Rosa canina.
Dragon-tree, Dracœna ferrea.
Date-palm, Phœnix humilis.
Elder, Sambucus nigra, 3.
Fennel, Fœniculum officinale.
Fig-tree, Ficus carica.
Gesnera grandis.
Gum-tree, Eucalyptus, 3.
Gutta-Percha Tree, Isonandra gutta, 3.
Grape-vine, Vitis vinifera.
Hibiscus Africanus, 3.
Ivy, Hedra helix.
India-rubber, Ficus elastica.
Jasmine.
Jasminum officinale.
Lavender, Lavandula vera.
Lace Bark, Lagetta lintearia, 3.
Land Rush, Juncus communis.
Larch, Larix, 3.
Larix Europæus, 3.
Lemon-tree, Citrus limonum.
Magnolia grandiflora.
Mahogany, Swietenia mahagoni, 3.
Maple, Acer campestre, 3.
Mimosa Nilotica.
Mulberry, Morus Nigra, 3.
Miltonia cuneata.
Misletoe, Viscum album.
Oak, Quercus pedunculata, 3.
Orange-tree, Citrus aurantium, 3
Pampas-grass, Gynerium argenteum.
Passion-flower, Passiflora quadrangularis.
Pepper (Australia), Piper alba.
" (Malacca), P. Nigrum.
Pear-tree, Pyrus domestica.
Pine, Pinus strobus, 3.
Pine-apple, Ananas lucida.
Pilea Smilacifolia.
Plane-tree, Platanus Occidentalis, 3.
Sanseviera Zeylanica.
Sarsaparilla, Smilax officinalis.
Satin-wood, Chloroxylon Swietenia.
Screw-pine, Pandanus odoratissimus.
Sea Rush, Juncus maritimus.
Sunflower, Helianthus annuus.
Sandal-wood, Santalum album, 3.
Tea-tree, Lycium barbarum.
Traveler's Joy, Clematis vitalba.
Upas (Java), Antiaris toxicaria, 3.
Water-plantain, Alisma plantago.
Water-lily, Nuphar luteum.
Walnut, Juglans regia, 3.
Wellingtonia gigantea, 3.
Willow, Salix alba, 3.
Yew, Taxus baccata, 3.
Section of Petiole of Arum, Cinnamon, Date-palm, India-rubber, Oleander.
Bulb of Orchid, sections.
Pith of Rice Paper-tree.
Root of Wellingtonia gigantea.
Root-fern, Pteris aquilina.
Roots of various Trees.
Bark " "

POLLENS, CUTICLES, etc.

50 and 60 cents each. $5.00 and $6.00 per dozen.

Pollens.

From Cobœa scandens. Œnothera, Convolvulus, Geranium, Hollyhock, Lily, Nasturtium, Flax, Lobelia, Cuphea platycenta, Mallow, Passion-Flower, Arum, Yucca, Vegetable Marrow, Portugal Pine.

Sections of Hard Tissues.

Betel-nut Palm, Areca pumila.
Vegetable Ivory-nut.
Cuticle of ditto. Surface and Verticle Section.
Shell of Cocoa-nut, Brazil-nut, Coquilla-nut, Attalca funifera, Mexican Gourd, Circubita pepo.
Stone of Apricot, Damson, Peach.
Transverse Section of Cherry-stone, with separate elementary particles, 2s.
Filaments from Stamens of Tradescentia.
Fructification on Fronds of various Ferns.

Sections of Seeds and Fruit.

Bitter Almond, Young unripe Orange.
Hemlock-seed, Coriander, Coffee, Pepper, Wheat, Parsley, Wild Parsley.
Collomia-seed, to show development of Spiral Vessels in fluid, 10c. packet.
Cuticles of Cherry, Plum, Rhubarb, of Leaf, Wild Mustard, Ivy, Fern.
Cuticles of Petals from Geranium, Peony, Pansy, Fritillaria, Nasturtium, Verbena.
Stomata in Cuticle of Orchid, Iris, Lily, Aloe, Ivy, Yucca, Peony, Box, Tritoma uvaria, House Leek.
Hairs from Leaf of Pansy, Groundsel, Blanket Plant, Tobacco, Lavender, Moss-rose, Sweet-briar, Tillandsia argentea.
Spiral Vessels, Collomia-seed, Rhubarb.
Compound Vessels from Nymphæ edulis.
Spiro-annular Vessels, Musa paradisiaca.
Scalariform Vessels from various Ferns.

DOUBLE-STAINED VEGETABLE PREPARATIONS.

60 cents to $1.00 each. $6.00 to $10.00 per dozen.

These very beautiful and exclusively American productions, the work of Mr. L. R. Peet, of Baltimore, and of our Mr. Walmsley, are now for the first time advertised in any catalogue, and in calling the attention of Microscopists to them, we feel we are doing a good service. No other mode of preparation ever devised, so completely differentiates and discloses every portion of a tissue, whilst the beauty of the object is the admiration of all observers.

They comprise a great variety of Stem and Leaf sections, sections of Ovaries, Pistils and Seeds, Leaves of every description, showing both upper and lower surfaces, as well as internal structure, Petals of Flowers, Mosses, and Leaves of Ferns in Fruit. They need only to be seen to be appreciated.

MICRO-PHOTOGRAPHS.

50 cents each. $5.00 per dozen.

Lincoln Cathedral.
The Blind Fiddler.
Equestrian Statue, Richard II.
The Dame's School.
Cupid and Psyche.
Laying Down the Law.
The Planet Jupiter, Belts and Moons.
The Planet Saturn, Rings of.
Belfast Naturalists' Club.
The Crucifixion (M. Angelo).
Hagar and Ishmael.
The Horse Fair (Mlle. Bonheur).
The South Sea Bubble.
Balmoral Castle.

Cathedral of Milan.
Hindoo Mosque, A. D. 1400.
York Minister.
£1000 Bank-Note.
Statue of Sabrina.
Title-Page of Punch.
Fingall's Cave.
Happy as a King.
Melrose Abbey.
Una and the Lion.
The Moon.
The Ten Commandments.
The Lord's Prayer.
The Origin of Species.
View in the Alps.
German Iron-Clad.
Bridge at Hamburg.
West Indian View.
"Unser Fritz."
Steamship Saxonia.
Falls of Niagara.
Prussian Bank-Note, 25 Thalers.
Bolton Abbey in the olden time.
The Giants' Causeway.
The Emperor Napoleon.
The Fall of Nineveh.
The Alhambra in Singapore Harbor.
The Ascent of Mount Blanc.
The Derby Day.
Raising the May-Pole.
The Maid of Saragossa.
Dicken's Christmas Carol.
View of Stockholm.
The Proposal.
Lord Byron.
Head of Christ.
London.
Alpine Glacier.
View in Heligoland.
Palace in Potsdam.
Ruins of Church, Norway.
View of Hammerfest.
St. Stephen's Church, Vienna.
Cupid.
Luna and Endymion.
Apollo and Daphne.
View in Norway.
Temple of Vesta, Rome.
Map of North America.
View in Pompeii.
View of Rome.
100-Thaler Bank-Note.
Grotto at Capri.
Un portant mal Payi.
Declaration of Independence, $1.00.

SERIES OF POPULAR OBJECTS.

25 cents each, $3.00 per dozen, $5.50 for two dozen in box.
Six dozen, in handsome mahogany case with twelve trays and lock, . $20.00

In order to meet the demand for objects of a popular character, at very low prices, we have prepared under Mr. Walmsley's supervision, a very large variety of beautiful, interesting and valuable subjects, at the above cheap rates. These comprise about one hundred varieties of Diatoms, many species of Algæ, Marine and Fresh-water, Foraminifera, Polycistina, Spicules of Synapta, Gorgonia and Sponges, insect parts in immense variety—opaque and transparent, some whole insects, vegetable preparations of every kind, including some Double Stainings, in short, a wonderful variety of objects deservedly *popular*. They are all clean, neatly mounted and correctly named, and though not *selected* as those named in the foregoing lists, many of them will be found fully equal in all particulars to the more expensive ones. An assortment will be sent on selection the same as the others.

SERIES OF HOUSEHOLD OBJECTS.

Slides $2\frac{3}{8}$x1 inch, 15 cents each. $1.50 per dozen.

This series of objects comprises most of the subjects named in the Popular Series, mounted on small slides of the French size, and are especially adapted to examination with the smaller and cheaper Microscopes. They are all good and clean, and being exceedingly cheap, a considerable assortment can be had for very little outlay. Every young person will appreciate their beauty and the instruction to be derived from their careful examination.

DR. SEILER'S MICROSCOPIC PREPARATIONS.

In the present advanced state of medical science, the microscope, and microscopic examinations, have become indispensable to every physician.

But few can obtain the necessary material for typical objects, and fewer still have the time to bestow upon the preparing and mounting of slides for subsequent study and comparison.

Dr. Seiler has, therefore, compiled several sets of objects—Pathological and Histological—mainly from human tissues, to which we would call your attention.

The material has been selected with a view to represent the Pathological changes ordinarily met with in the different organs; while in the Histological set the normal conditions of those organs will be brought out.

The preparations are stained by a process calculated to give the greatest possible brilliancy and differentiation of structural detail, and are mounted in Canada balsam, under the thinest cover glasses, so that the higher powers may be used in examining finer details.

Each set comprises twenty-four objects, contained in a neat walnut cabinet, arranged diagonally so as to enable one to read all the headings at a glance. The labels are printed and give a short description, beside the name, of the most important points shown in the specimen.

The price has been fixed at as low a figure as possible, namely: $15.00 per set.

Beside the Pathological and Normal Sets, a series of Cancer Preparations—twenty in the set—is now being mounted, and will soon be offered for sale at the same price.

Larger and special sets will be furnished to order.

HISTOLOGICAL SERIES.

1. Lung, Man.
2. " Fœtus, Human.
3. Kidney, Child at birth.
4. " Cat, injected.
5. Liver, Man.
6. Spleen, "
7. Heart, "
8. Aorta, "
9. Intestine, Man.
10. " Cat, injected.
11. Stomach, Man.
12. " Frog.
13. Tongue, Cat, injected.
14. Skin, Sole of Foot, Man.
15. Brain, Man.
16. Medulla, Oblongata, Man.
17. Uterus, after delivery.
18. Ovary, Human,
19. Muscular fibre, Cat, injected.
20. Mammary Gland, Human.
21. Testicle, Still-born Child.
22. Toe of Fœtus, 7 Months.
23. Finger of Fœtus, 7 Months.
24. Wrist of Fœtus, 7 Months.

PATHOLOGICAL SERIES.

1. Lung, Phthisis, Man.
2. " Tuberculosis, Man.
3. " Interstitial Pneumonia, Man
4. " Croupous " "
5. " Catarrhal " "
6. Kidney, Large White, Man.
7. " Fatty, "
8. " Amyloid, "
9. " Interstitial Nephrites, Man
10. " Cirrhosis, Man.
11. Liver, Nutmeg, "
12. " Cirrhosis, "
13. Liver, Yellow Atrophy, Man.
14. " Jaundice, Man.
15. Spleen, Amyloid, "
16. Heart, Fatty, "
17. Aorta, Atheroma, "
18. Tonsil, Hypertrophy, Man.
19. Mammary Gland, Schirrus, Man.
20. Intestine, Tubercular, Man.
21. Stomach, Schirrus, "
22. Brain, Sclerosis, Man.
23. Uterus, Fibroid, "
24. Ovary, Cyst, Man.

DEMONSTRATION LENSES.

No.		Price.
1206.	Demonstration Lenses. A set of six, 1¾ inches diameter, showing the forms of the various kinds of lenses, viz.: Double Convex, Double Concave, Plano-Convex, Plano-Concave, Meniscus Convex, and Meniscus Concave. Per set, ...	$2 50

COSMORAMA LENSES.

1209.	Double or Plano-Convex Lens, 8 inches diameter, and either 30, 36, 48 or 72 inches focus, each, ...	4 00
1210.	Double or Plano-Convex Lens, 7 inches diameter, same foci as 1209, each, ...	3 25
1211.	Double or Plano-Convex Lens, 6 inches diameter, of either 24, 30, 36, 48 or 72 inches focus, each, ...	2 50
1212.	Double or Plano-Convex Lens, 5 inches diameter, of either 18, 20, 24, 30, 36, 48 or 72 inches focus, each, ...	2 00
1213.	Double or Plano-Convex Lens, 4 inches diameter, of either 12, 14, 16, 18, 20, 24, 30, 36, 48 or 72 inches focus, each, ...	1 25
1214.	Double or Plano-Convex Lens, 3 inches diameter, any focus 6 to 36 inches, each, ...	1 00
1215.	Double or Plano-Convex Lens, 2 inches diameter, any focus 6 to 36 inches, each, ...	75
1216.	Double or Plano-Convex Lens, 1¼ inches diameter, any focus 5 to 48 inches, each, ...	50

MICROSCOPE AND TELESCOPE LENSES.

1217.	Double or Plano-Convex Lens, 1 inch diameter, 2 inches focus,	75
1218.	" " " ¾ " 1½ "	75
1219.	" " " ⅝ " 1¼ "	75
1220.	" " " ½ " 1 "	75
1221.	" " " ⅜ " ¾ "	75
1222.	" " " ¼ " ½ "	75
1223.	" " " 3/16 " ¼ "	75
1224.	" " " ⅛ " ⅛ "	75

ACHROMATIC OBJECT-GLASSES for SPY-GLASSES and TELESCOPES.

1225.	Achromatic Object-Glass, 1½ inches diameter, 18 to 30 inches focus,	2 00
1226.	" " 1¾ " " 18 to 30 " "	3 50
1227.	" " 2 " " 18 to 30 " "	4 00
1228.	" " extra fine finish, 2 in. diam., 36 in. focus,	6 00
1229.	" " " " 2½ " 44 "	10 00
1230.	" " " " 3 " 48 "	25 00
1231.	" " " " 3½ " 54 "	50 00
1232.	" " " " 4 " 60 "	80 00

PRISMS.

No.						Price.
1235.	Solid Flint Glass Prisms,	3	inches	long.	each,	$ 50
1236.	"	"	4	"	"	65
1237.	"	"	5	"	"	85
1238.	"	"	6	"	"	1 00
1239.	"	"	7	"	"	1 25
1240.	"	"	8	"	"	1 75

READING AND PICTURE GLASSES.

1325. Reading Glass, oxidized metal frame, double convex lens, 2½ inches diameter, ... 1 00

1327. Reading Glass, oxidized metal frame, double convex lens, 3½ inches diameter, ... 1 75

1329. Reading Glass, oxidized metal frame, double convex lens, 4½ inches diameter, ... 3 00

1330. Reading Glass, gilt metal frame, ivory handle, one double convex lens, 2½ inches diameter, ... 2 50

1331. Reading Glass, gilt metal frame, ivory handle, double convex lens, 4 inches diameter, ... 4 00

1332. Reading Glass, black metal frame, wood handle, double convex lens, 3 inches long by 1½ inches wide, ... 1 25

1333. Reading Glass, black metal frame, wood handle, double convex lens, 4 inches long by 2 inches wide, ... 2 00

1334. Picture Glasses, wood frame and handle, double convex lens 5 inches diameter, ... 4 00

1335. Picture Glasses, wood frame and handle, double convex lens 6 inches diameter, ... 5 00

DOUBLE CYLINDRICAL READING GLASSES.

These entirely new and very superior Reading Glasses are made of a double cylindrical lens, with its axes crossing at right angles, giving an entirely flat field free from chromatic or spherical aberration, reading to the extreme edge. Their great superiority to the old form of double convex lenses is apparent at a glance.

1340. Reading Glass, double cylindrical, German silver frame, black handle, 2x3 inches, ... $2 50

1341. Reading Glass, double cylindrical, German silver frame, black handle, $2\frac{3}{16}$x$3\frac{1}{4}$ inches, ... 3 50

1342. Reading Glass, double cylindrical, German silver frame, black handle, $2\frac{5}{16}$x$3\frac{3}{4}$ inches, ... 4 50

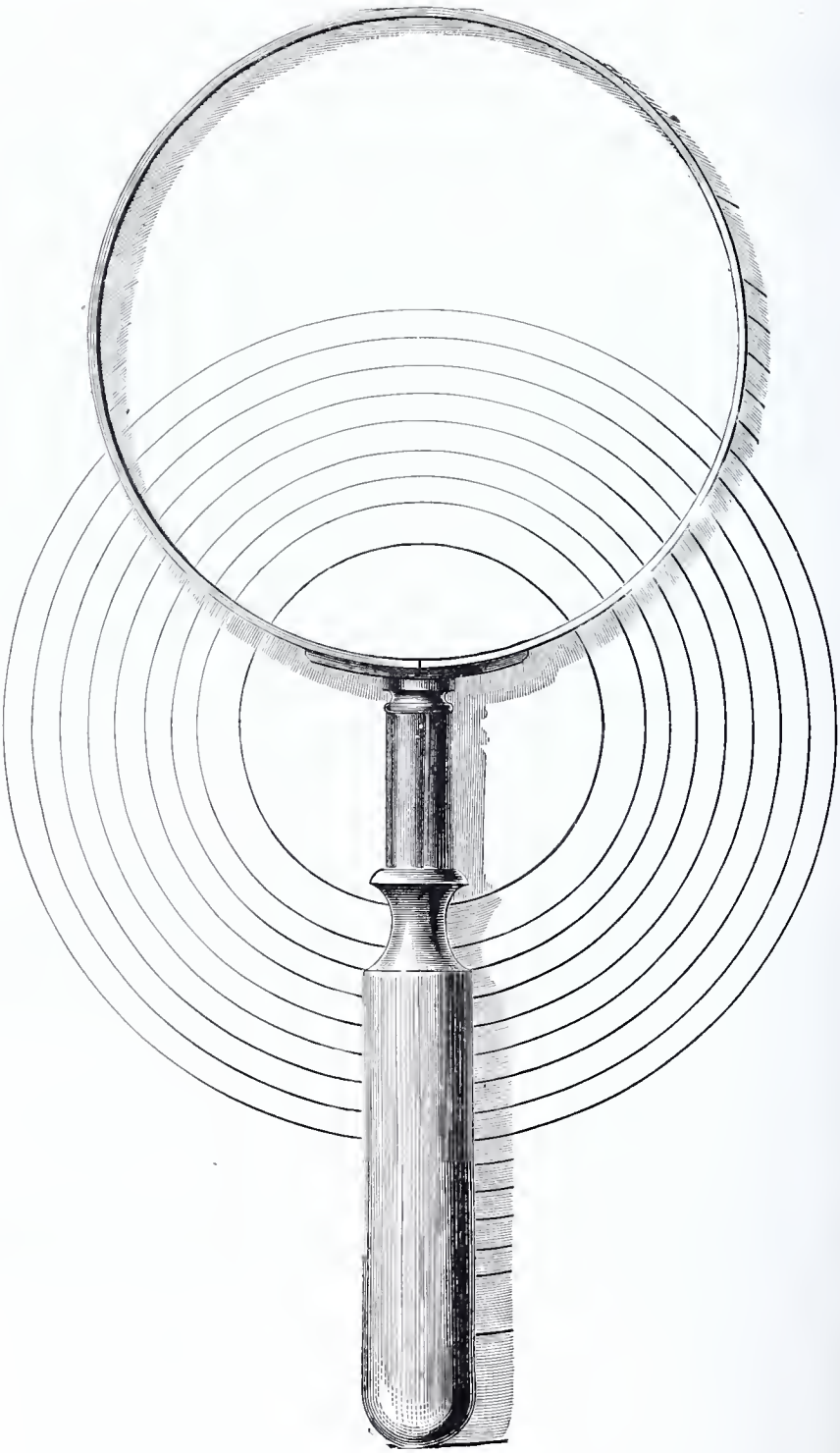
1343. Reading Glass, double cylindrical, German silver frame, black handle, $2\frac{3}{4}$x$4\frac{1}{4}$ inches, ... 5 50

1344. Reading Glass, double cylindrical, German silver frame, black handle, $2\frac{5}{8}$x$4\frac{1}{2}$ inches, ... 6 50

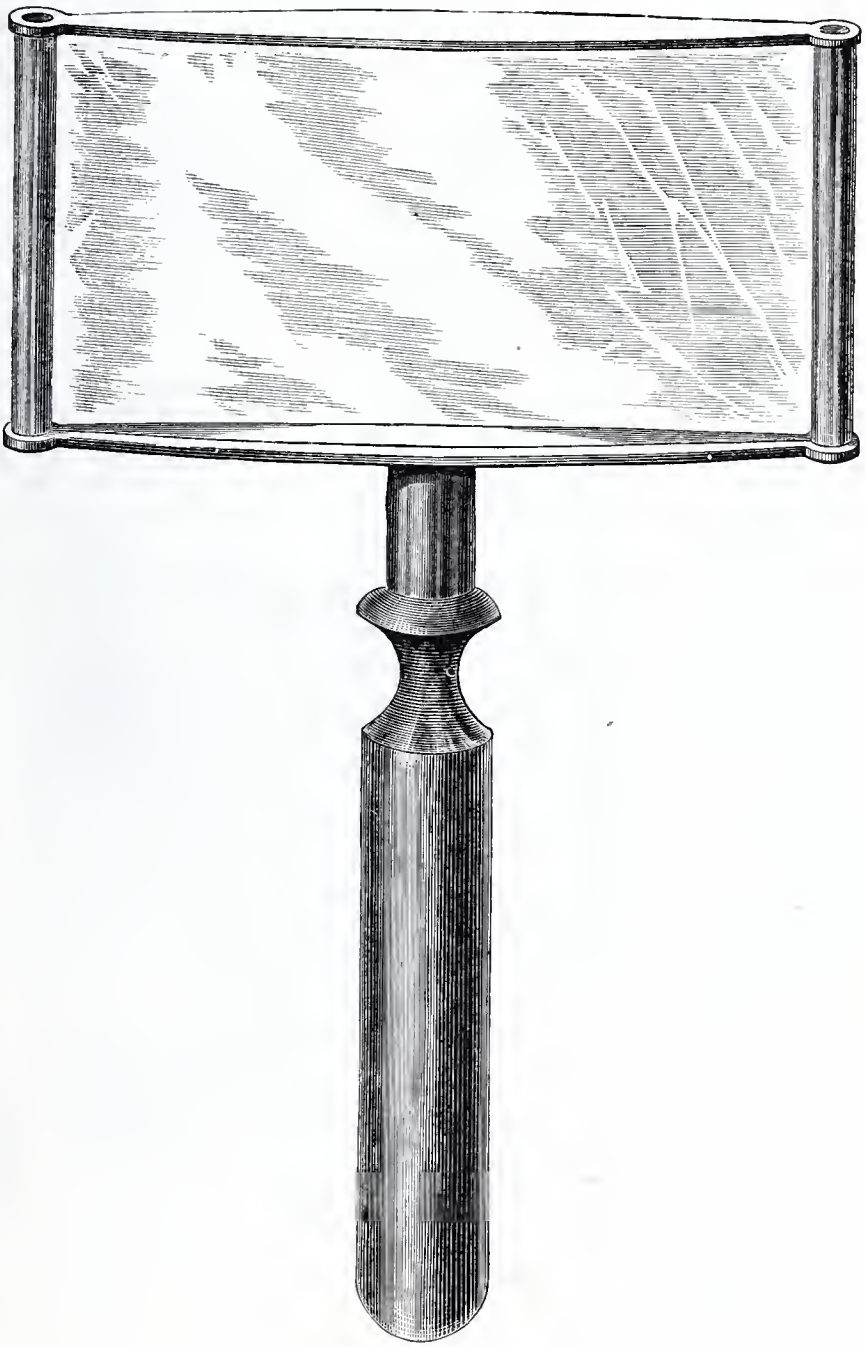
1345. Reading Glass, double cylindrical, German silver frame, ivory handle, 2x3 inches, ... 4 00

1346. Reading Glass, double cylindrical, German silver frame, ivory handle, $2\frac{3}{16}$x$3\frac{1}{4}$ inches, ... 5 00

1347. Reading Glass, double cylindrical, German silver frame, ivory handle, $2\frac{5}{16}$x$3\frac{3}{4}$ inches, ... 6 00



Nos. 1325 to 1335.



Nos. 1340 to 1350.

No.		Price.
1348.	Reading Glass, double cylindrical, gilt frame, ivory handle, $2\frac{3}{16}$x$3\frac{1}{4}$ inches,	$6 00
1349.	Reading Glass, double cylindrical, gilt frame, ivory handle, $2\frac{3}{4}$x$4\frac{1}{4}$ inches,	9 50
1350.	Reading Glass, double cylindrical, gilt frame, ivory handle, $2\frac{7}{8}$x$4\frac{1}{2}$ inches,	10 50

ACHROMATIC SPY-GLASSES OR TELESCOPES.

No. 1375.

No. 1381.

No. 1385.

No. 1390.

1375. Achromatic Spy-glass, with wood body, and three draws, 15 inches long when drawn out, 6 inches long when shut up; object-glass 1 inch in diameter. Power 15 times, ... $2 50

1376. Achromatic Spy-glass, with wood body, and three draws, 16 inches long when drawn out, 6 inches long when shut up; object-glass $1\frac{1}{8}$ inches in diameter. Power 20 times, ... 3 50

1377. Achromatic Spy-glass, with wood body, and three draws, 23 inches long when drawn out, 8 inches long when shut up; object-glass $1\frac{3}{8}$ inches in diameter. Power 25 times, ... 5 00

1378. Achromatic Spy-glass, with wood body, and three draws, 30 inches long when drawn out, 10 inches long when shut up; object-glass $1\frac{5}{8}$ inches in diameter. Power 30 times, ... 7 50

1379. Achromatic Spy-glass, with wood body, and four draws, 37 inches long when drawn out, 11 inches long when shut up; object-glass $1\frac{7}{8}$ inches in diameter; a very superior glass. Power 35 times. . 12 50

No. 1391-96

No. 1389.

No. 1388.

No. PRICE.

1380. Achromatic Spy-glass, with wood body, and four draws, 42 inches long when drawn out, 11½ inches long when shut up; object-glass 2⅛ inches in diameter, with sun-glass. Power 40 times, . . $20 00

1381. Achromatic Spy-glass, with wood body, and four draws, 48 inches long when drawn out, 13½ inches long when shut up; object-glass 2⅜ inches in diameter, with sun-glass. Power 50 times, . . 30 00

1385. Achromatic Spy-glass, with metal body covered with Moroeco, two draws, 30 inches long when drawn out, 20 inches long when closed; object-glass 1½ inches in diameter. Power 30 times, . 10 00

1387. Rifle Spy-glasses, 10¾ inches long; object-glass ½ inch diameter, . 3 00

1388. Naval Achromatic Spy-glass, tapering wood body and one draw, 55 inches long when drawn out, 45 inches long when shut up; rack and pinion for adjusting tho focus. Power 50 times. . . 40 00

1389. ***Binocular Telescope on Stand,*** 115 00

This instrument may be placed either on a broad window-sill or on a table, and is intended for use at the sea-side or where there is an extensive prospeet. The Achromatic Object-Glasses are $1\frac{6}{10}$ inches in diameter, magnifying 15 linear. The adjustment for focus is mado with rack and pinion. The distance between the eyes is regulated by a small milled head on the top of the box. The two wheels attached to one end of tho Stand allow of a steady and easy horizontal movement, and the large milled head underneath, (as shown in the illustration), gives a vertical one.

1389.* BINOCULAR TELESCOPE for hand use, mounted as an ordinary Field Glass. Object glasses $1\frac{6}{10}$ inch in diameter, magnifying power 12 linear; Sun and spray shade, in solid leather sling case, complete, ... 75 00

1390. Wooden Tripod Stand, with vertical and horizontal motion, upon which to place a spy-glass; an exceedingly useful article, as a glass of much power cannot be held in the hand with suffieient steadiness to produco the best effect, ... 5 00

PORTABLE CLAMPS FOR SPY-GLASSES.

1391. Brass Clamp with Gimlet Screw, to fasten spy-glasses 1375 and 1376 to a Post or Tree, ... 1 75

1392. The same to fit spy-glass 1377, ... 2 00

1393. " " " 1378, ... 2 75

1394. " " " 1379, ... 3 25

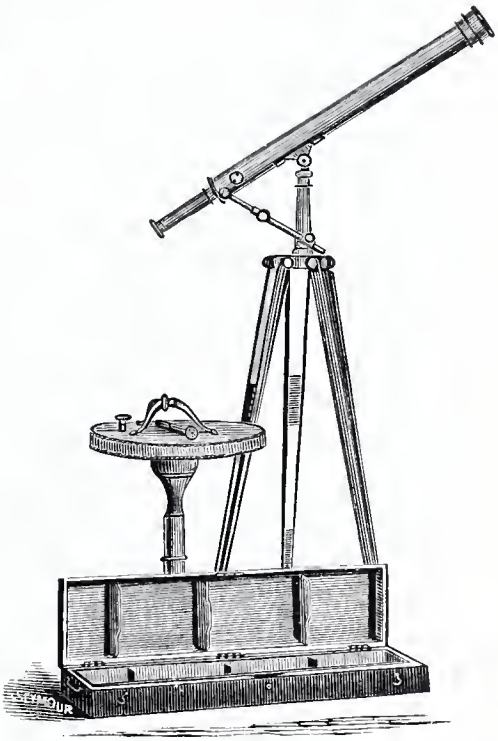
1395. " " " 1380, ... 3 75

1396. " " " 1381, ... 4 25

ASTRONOMICAL TELESCOPES.

By Bardou, Paris.

No. 1400.



No. 1405.

No.		Price.
1400.	Astronomical Telescope, body and movements all brass, with Rack Adjustment for Focus, Object-glass 2¼ inches diameter, one Terrestrial and one Celestial Eye-piece and Sun-glass, packed in strong Walnut wood case, with lock and key. The body is mounted upon a firm tripod stand of Mahogany, affording every facility for observation, ...	$60 00
1401.	The same, with Object-glass 2½ inches diameter, ...	70 00
1402.	The same, with Object-glass 3 inches diameter, . . .	110 00
1403.	The same, with Object-glass 3½ inches diameter, . . .	175 00
1404.	The same, with Object-glass 4 inches diameter, ...	250 00
1405.	Astronomical Telescope, body and movements all brass, with Rack Adjustment for Focus, and ditto for vertical movement of body, mounted on brass tripod similar to 1395, and in addition has a fine tripod stand of Mahogany for out-door use, Object-glass 3 inches diameter, two Terrestrial and one Celestial Eye-piece and Sun-glass, in strong Walnut case with lock, . . .	150 00
1406.	The same, with Object-glass 3½ inches diameter, and two Celestial Eye-pieces, ...	225 00
1407.	The same, with Object-glass 4 inches diameter, and three Celestial Eye-pieces, ...	325 00
1408.	The same, with Object-glass 4¼ inches diameter, Searcher and three Celestial Eye-pieces, ...	450 00

ASTRONOMICAL TELESCOPES.

OUR OWN MANUFACTURE.

No. PRICE.

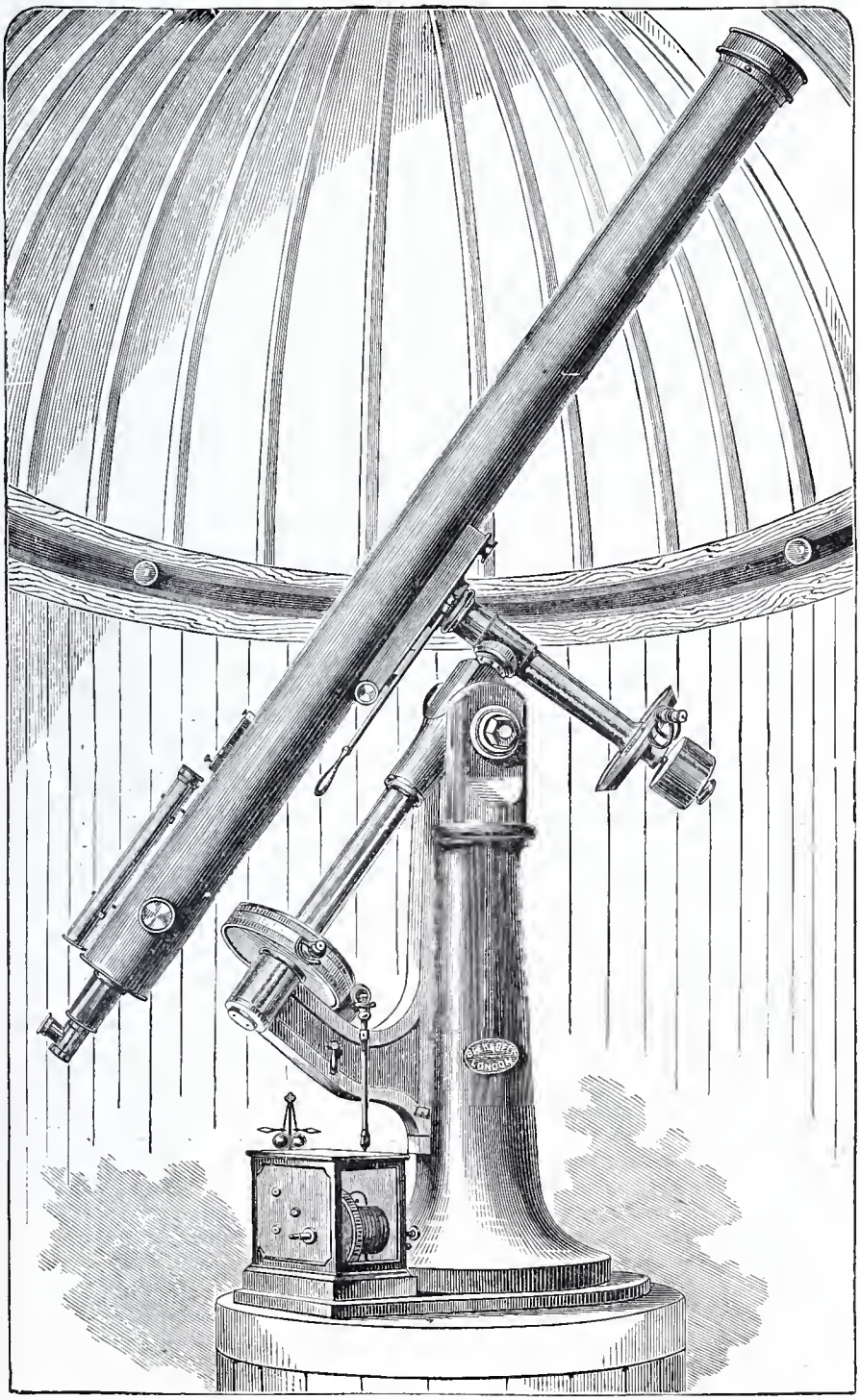
1422. ASTRONOMICAL TELESCOPE ON PILLAR-AND-CLAW STAND. Achromatic Object-glass 2¼ inches in diameter. Focal length 3 feet. One Terrestrial Panoratic Eye-piece, magnifying from 15 to 30 linear; one Astronomical Eye-piece with Sun-shade, magnifying 60 linear. Focal adjustment by Rack and Pinion. Mounted on handsome Pillar-and-Claw Stand. The whole packed in a strong Mahogany case. $115 00

1423. ASTRONOMICAL TELESCOPE ON PILLAR-AND-CLAW STAND. Achromatic Object-glass 2¾ inches in diameter, Focal length 3½ feet. Panoratic Terrestial Eye-piece, magnifying from 20 to 40 linear. Three Astronomical Eye-pieces, with Sun-shades, magnifying respectively about 20, 60 and 100 linear: Rack-and-Pinion Adjustment to the focus. Telescope mounted on handsome Pillar-and-Claw Stand as No. 1422. The whole packed in a strong Mahogany case, ... 175 00

1424. ASTRONOMICAL TELESCOPE ON PILLAR-AND-TRIPOD STAND. Achromatic Object-glass 2¾ inches in diameter, Focal length 3½ feet. Panoratic Terrestrial Eye-piece, magnifying from 20 to 40 linear. Three Astronomical Eye-pieces, with Sun-shade, magnifying respectively about 20, 60 and 100 linear. First-surface Diagonal Reflector for observing the Sun, Rack-and-Pinion Adjustment to the focus. Finder same as No. 1425, and Dew-shade. Telescope mounted on Pillar-and-Tripod Stand, with Vertical and Horizontal movements by Rack and Screw, and Steadying-rods. The whole packed in a strong Mahogany case, ... 225 00

1425. ASTRONOMICAL TELESCOPE ON PILLAR-AND-TRIPOD STAND. Achromatic Object-glass 3½ inches in diameter, Focal length 4 feet. Panoratic Terrestrial Eye-piece, magnifying from 20 to 40 linear. Four Astronomical Eye-pieces, with Sun-shades, magnifying respectively about 20, 40, 60 and 100 linear. First-surface Diagonal Reflector for observing the Sun, Rack-and-Pinion Adjustment to the focus. Finder and Dew-shade. Telescope mounted on Pillar-and-Tripod Stand, with Vertical movement by Rack and Pinion, and Horizontal movement by an endless Screw. Sliding Steadying-rods. The whole packed in a strong Mahogany case, ... 350 00

1426. ASTRONOMICAL TELESCOPE ON AN EQUATORIAL STAND. Achromatic Object-glass 3½ inches in diameter, Focal length 4 feet. Panoratic Terrestrial Eye-piece, magnifying from 20 to 40 linear. Four Astronomical Eye-pieces, with Sun-shades, magnifying respectively about 20, 40, 60 and 100. First-surface Diagonal Reflector for observing the Sun. Finder as in No. 1427, Rack-and-Pinion Adjustment to the focus. Telescope mounted on a strong Equatorial Stand. Declination Circle 4 inches in diameter, divided to 30′, with two Verniers reading to 30″. The Hour Circle 4 inches in diameter, divided to 2 minutes, with two Verniers reading to 2 seconds of time. The Polar Axis and Declination Axis of brass, fixed on a strong cast-iron Column, with adjustments for Latitude, Azimuth, etc. The Telescope and Equatorial part packed in Mahogany cases, ... 475 00



No. 1427.

No. PRICE.

1427. ASTRONOMICAL TELESCOPE ON AN EQUATORIAL STAND. Achromatic Object-glass 4½ inches in diameter, Focal length 5½ feet. Four Astronomical Eye-pieces, with Sun-shades, magnifying respectively about 20, 40, 70 and 140. First-surface Diagonal Reflector for observing the Sun. Finder. Rack-and-Pinion Adjustment to the focus. Complete Illuminating apparatus. Telescope mounted on a strong Equatorial Stand. The Declination Axis fitted into a cast-iron Socket, bolted on to the Polar Axis. The Declination Circle 8 inches in diameter, divided to 30′, and reading to 30″ of arc. The Polar Axis, working in a fitting and on a Steel Ball, and attached to it a Right-Ascension Circle, 8 inches in diameter, divided to minutes, with two Verniers, reading to seconds of time. This Circle is arranged so that the Telescope can be set in Right Ascension without any calculation. A Driving Circle connected with the Clock, whose rate is governed by Balls and Fans: this can be detached at pleasure. A fine adjustment in Declination fixed to the Telescope, and all other necessary adjustments supplied. The whole mounted on a strong cast-iron Column, with ready adjustments for Latitude, Azimuth, etc., ... $1000 00

1428. ASTRONOMICAL TELESCOPE ON AN EQUATORIAL STAND. Achromatic Object-glass 5 inches in diameter, Focal length about 6 feet, 6 inches. Five Astronomical Eye-pieces, with Sun-shades, magnifying respectively about 40, 60, 100, 150 and 200. First-surface Diagonal Reflector for observing the Sun. Position Circle at Eye-end graduated on Silver, with two Verniers and Microscopes, reading to minutes. Finder and Dew-shade, Rack-and-Pinion Adjustment to focus. Parallel Wire Micrometer with Double Movable Lines, four Eye-pieces, magnifying about 200, 300, 400 and 600 linear. Complete Illuminating apparatus. Telescope mounted on a strong Equatorial Stand. The Declination Axis fitted into and working in a cast-iron Socket, bolted on the Polar Axis. The Declination Circle 12 inches in diameter, divided to 10′, with two Verniers and Microscopes, reading to 10″ of arc. To the Polar Axis is fixed a Right-Ascension Circle, divided to 2 minutes, with two Verniers, reading to 2 seconds of time. This Circle is arranged so that the Telescope can be set in Right Ascension without any calculations. A Driving Circle is connected with the Clock, whose rate is governed by Balls and Fans: this can be thrown out of gear at pleasure. Fine adjustments in Right Ascension and Declination by means of Tangent Screws and Hooks' joints, conveniently placed. The whole mounted on a strong cast-iron Pillar, with ready adjustments for Latitude, Azimuth, etc., ... 1500 00

1429. ASTRONOMICAL TELESCOPE ON EQUATORIAL STAND. Achromatic Object-glass 6 inches in diameter, Focal length about 7 feet, 6 inches. Six Astronomical Eye-pieces, with Sun-shades, magnifying respectively about 40, 60, 100, 150, 200 and 400 linear. First-surface Diagonal Reflector for observing the Sun. Position Circle at Eye-end graduated on Silver, with two Verniers and Microscopes, reading to minutes. Finder and Dew-shade, Rack-and-Pinion Adjustment to focus. Parallel Wire Micrometer, with Double Movable Lines, four Eye-pieces, magnifying about 200, 300, 400 and 600 linear. Complete Illuminating apparatus. Telescope mounted on a strong Equatorial Stand. The Declination Axis bolted at right angles to the Telescope, and

No.		Price.
	fitted into an iron socket bolted on the Polar Axis. The Declination Circle, 16 inches in diameter, divided to 10′, with Two Verniers and Microscopes, reading to 10″ of arc. To the Polar Axis is fixed a Right-Ascension Circle, divided to 2 minutes, with two sets of Verniers, reading to 2 seconds of time. This Circle is arranged so that the Telescope can be set in Right Ascension without any calculations. A Driving Circle connected with the Clock, whose rate is governed by Balls and Fans: this can be thrown in and out of gear at pleasure. Fine adjustments in Right Ascension and Declination by means of Tangent Screws and Hooks' joints, conveniently placed. The whole mounted on a strong cast-iron Pillar, with ready adjustments for Latitude, Azimuth, etc.,	$2400 00
1431.	Parallel Wire Micrometer, Double Movable Lines, four Eye-pieces, powers varied at pleasure packed in a Mahogany case,	100 00
1432.	Double Image-Micrometer,	100 00
1433.	Annular Micrometer, with Eye-piece,	8 00
1434.	Micrometer, ruled on Glass to parts of an Inch or Metre, fitting any Eye-piece,	4 00
1437.	Illuminating Apparatus,	40 00
1439.	Driving-Clock and Connecting Gear,	80 00
1441.	Diagonal Reflector, First-surface glass for Solar observations,	15 00
1443.	Huygenian Eye-piece, any power,	7 50
1444.	Sun-Shade,	2 00
1446.	Varley's Telescope-Stand, complete fittings,	100 00

Special Estimates given for Mounting Telescopes.

OBJECT-GLASSES, First Quality, Mounted in Brass Cells.

1451.	Object-Glass,	$1\frac{1}{10}$	inches	diameter,	Focal	Length,	9 inches,	4 00
1452.	"	"	$1\frac{6}{10}$	"	"	"	1 foot, 6 inches,	6 00
1453.	"	"	$1\frac{8}{10}$	"	"	"	2 feet,	10 00
1454.	"	"	$2\frac{1}{4}$	"	"	"	3 feet,	20 00
1455.	"	"	$2\frac{3}{4}$	"	"	"	3 feet, 6 inches,	50 00
1456.	"	"	$3\frac{1}{2}$	"	"	"	4 feet,	100 00
1457.	"	"	$4\frac{1}{2}$	"	"	"	5 feet, 6 inches,	240 00
1458.	"	"	5	"	"	"	6 feet, 6 inches,	320 00
1459.	"	"	6	"	"	"	7 feet, 6 inches,	550 00

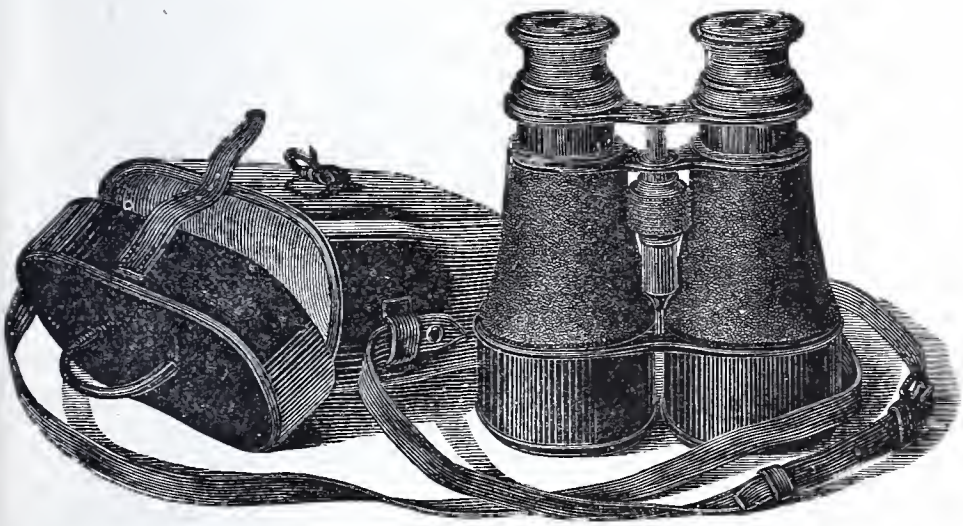
Telescopes 1400 to 1408 are of most excellent construction, with well-corrected Object-glasses, and very finely mounted. Those from 1422 to 1429 are of the very finest quality; no pains being spared to render them first-class in every respect.

ACHROMATIC MARINE AND FIELD GLASSES.

These Glasses are designated according to the diameter of the Object-glasses in French lines, as follows:

11	Lines	are equal to	1 inch.
13	"	"	$1\frac{3}{16}$ inches.
15	"	"	$1\frac{5}{16}$ "
17	"	"	$1\frac{1}{2}$ "
19	"	"	$1\frac{11}{16}$ "
21	"	"	$1\frac{7}{8}$ "
24	"	"	$2\frac{1}{8}$ "
26	"	"	$2\frac{5}{16}$ "

They are all constructed with six lenses, unless the contrary is specially stated, and are invariably well corrected and adapted to all visions.



1500–1502.

No.		Price.
1500.	***Binocular Horizon Sweep,*** in solid Leather sling case, . .	$35 00

This glass has been expressly designed and constructed at our own works, for yachting purposes, and to meet the requirements of Captains. The framework, which is of brass, bronzed, and covered with strongly-stitched leather, is made very strong. The Achromatic Object-glasses are carefully corrected, and the Eye-pieces are arranged so as to give the maximum amount of light, thus rendering it especially useful in foggy weather or during twilight. The solid Leather case is of the very best make.

No. PRICE:

1501. Lemaire's U. S. Army Signal Service Marine or Field Glass, metal body, covered with Turkey Morocco, Sun-shades to extend over the Object-glasses, and heavy Leather case, with strap; very superior.

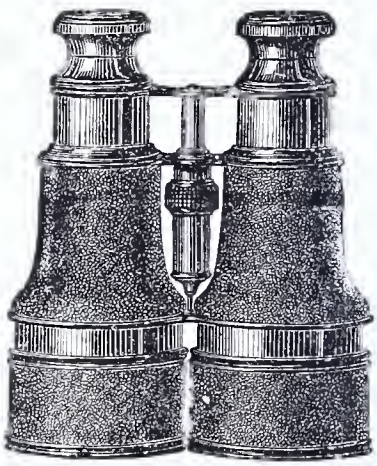
Object-glasses,	19	lines	in diameter,	$15 00
"	21	"	"	16 00
"	24	"	"	18 00
"	26	"	"	20 00

1502. Bardou's U. S. Army Signal Service Marine or Field Glass, body covered with Turkey Morocco, Sun-shades to extend over the Object-glasses, in fine Leather case, with strap; the best article made. This glass bears our own trade-mark, and is made expressly for our sales.

Object-glasses,	19	lines	in diameter,	20 00
"	21	"	"	22 50
"	24	"	"	25 00
"	26	"	"	27 50

1503. Bardou's U. S. Army Signal Service Marine or Field Glass, the same as 1502, with addition of a hinge adjustment for varying distance between the eyes, in stiff Leather case, with strap.

Object-glasses,	19	lines	in diameter,	22 50
"	21	"	"	25 00
"	24	"	"	27 50
"	26	"	"	30 00



1504.

1504. FIELD GLASS, metal body, covered with Morocco, Sun-shades to extend over the Object-glasses, and stiff Leather case, with strap; an excellent glass.

Object-glasses,	19	lines	in diameter,	8 00
"	21	"	"	10 00
"	24	"	"	12 00
"	26	"	"	13 50

1505. FIELD AND MARINE GLASS, metal body, covered with black Morocco, Sun-shades to Object-glasses, large-sized Eye-pieces, in soft collapsable Leather case, with slings; a very superior and substantial article.

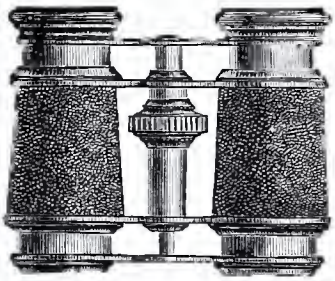
Object-glasses,	19	lines	in diameter,	12 50
"	21	"	"	15 00
"	24	"	"	16 50
"	26	"	"	18 00

No. PRICE.

1506. BINOCULAR GLASS, with three adjustable Eye-pieces of different powers, Field, Marine or Opera, metal bodies, covered with finest Turkey Morocco, Sun-shades to extend over the Object-glasses, and fine Leather case, with strap.

Object-glasses,	17	lines	in diameter,	$16 00
"	19	"	"	18 00
"	21	"	"	20 00
"	24	"	"	22 50

No. 1506.

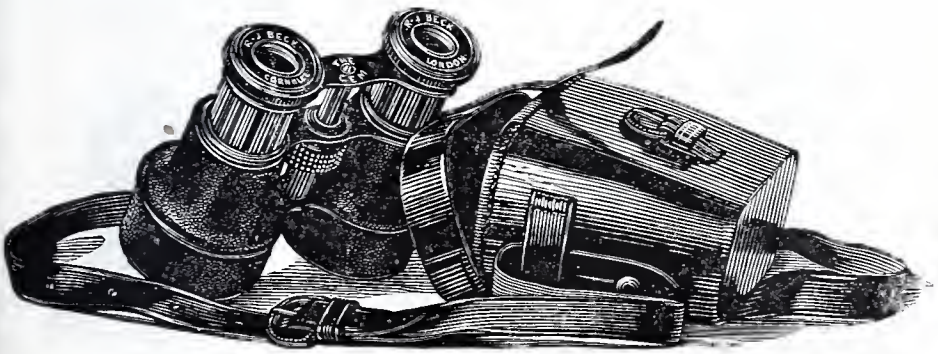


No. 1507.

1507. FIELD GLASS, Rock Crystal Lenses, double adjustment of focus, so that, when closed, the instrument can be conveniently carried in the pocket, in Morocco case, without strap; very powerful, but small field of view.

Object-glasses,	10	lines	in diameter,	15 00
"	11	"	"	16 50
"	15	"	"	18 00
"	17	"	"	20 00

THE GEM.



No. 1510.

1510. THE GEM, Field and Opera Glass, Object-glasses 19 lines in diameter, ... $20 00

This is the most powerful Glass of its size ever made, combining all the power and scope of a Field or Race Glass, with the portability and neatness of an Opera Glass. It is made in the most thorough manner at our own works, and is furnished either in a stiff Leather case, with sling for field use, or in a soft Leather case for the Opera. This Glass is of our own manufacture and is the only genuine *Gem* in the market.

OPERA GLASSES.

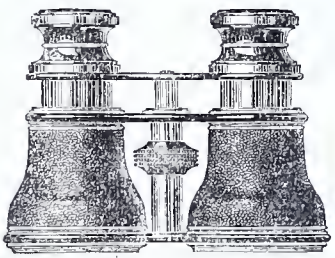
No. PRICE.

1515. OPERA GLASS, frame work all black, metal bodies covered with black leather, in soft Leather case.

Object-glasses,	13	lines in diameter,	. . . . .	$3 50
"	15	" "	. . . . .	4 50
"	17	" "	. . . . .	5 00
"	19	" "	. . . . .	6 00

1516. OPERA GLASS, black metal frames, very substantial, bodies covered with black Morocco, in soft Leather case.

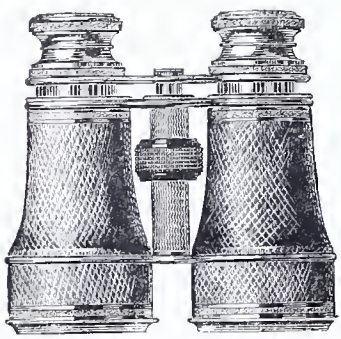
Object-glasses,	11	lines in diameter,	. . . . .	5 00
"	13	" "	. . . . .	5 50
"	15	" "	. . . . .	6 00
"	17	" "	. . . . .	7 00
"	19	" "	. . . . .	8 00



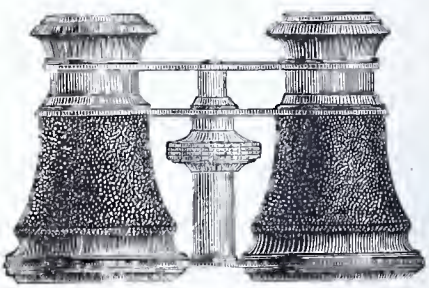
Nos. 1515–1517.

1517. OPERA GLASS, black metal frames, bodies covered with colored Morocco in handsome dark shades, in soft Leather case.

Object-glasses,	11	lines in diameter,	. . . . .	3 50
"	13	" "	. . . . .	4 00
"	15	" "	. . . . .	4 50
"	17	" "	. . . . .	5 00
"	19	" "	. . . . .	6 00



No. 1518.



No. 1519

1518. OPERA GLASS, very substantial, black metal frames, bodies covered with black Morocco, patented Eye-pieces, readily adjustable to the vision of the nearest-sighted person as well as to that of the far-sighted, in soft Leather case.

Object-glasses,	15	lines in diameter,	. . . . .	12 00
"	17	" "	. . . . .	13 50
"	19	" "	. . . . .	15 00

No. PRICE.

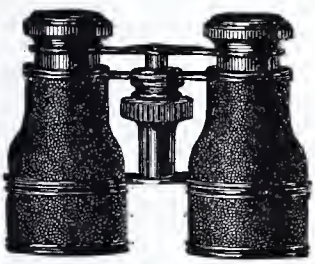
1519. OPERA GLASS, tops and cross-pieces black, tubes and bottom pieces richly gilt, bodies covered with handsome colored Morocco, with gilt trimmings top and bottom, very handsome and excellent glasses; in soft Leather case.

Object-glasses,	11	lines	in diameter,	$8 50
"	13	"	"	9 00
"	15	"	"	10 50
"	17	"	"	12 00
"	19	"	"	14 00

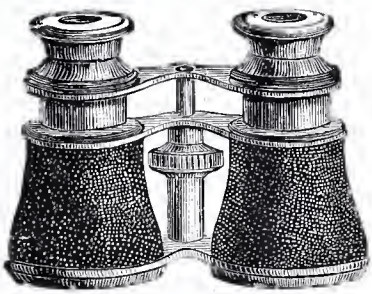
1520. OPERA GLASS, for the vest pocket, very small but with a large clear field of view, black metal frames, bodies covered with black Morocco with silk sling and in case.

Object-glasses,	13	lines	in diameter,	9 00
"	15	"	"	10 00

LEMAIRE'S AND BARDOU'S OPERA GLASSES.



Nos. 1525–1527.



Nos. 1530–1536.

1525. OPERA GLASS, (Lemaire's), substantial black metal frames, bodies covered with best black Morocco leather, in soft Leather case.

Object-glasses,	11	lines	in diameter,	$6 00
"	13	"	"	6 50
"	15	"	"	7 00
"	17	"	"	8 00
"	19	"	"	9 00

1526. OPERA GLASS, (Lemaire's), substantial black metal frames, bodies covered with handsome colored Morocco leather of various shades, in soft Leather case.

Object-glasses,	11	lines	in diameter,	6 00
"	13	"	"	7 00
"	15	"	"	7 50
"	17	"	"	8 00
"	19	"	"	9 00

1527. OPERA GLASS, (Lemaire's), tops and cross-pieces black metal, tubes richly gilt, bodies covered with handsome colored Morocco leather of various shades, in soft Leather case.

Object-glasses,	11	lines	in diameter,	7 00
"	13	"	"	7 50
"	15	"	"	8 50
"	17	"	"	9 00
"	19	"	"	10 00

No.				Price.
1530.	Opera Glass, (Bardou's), light but very strong, black metal frames, bodies covered with finest black Morocco leather, in soft Leather case, very superior in power and size of field.			
	Object-glasses, 12 lines in diameter,			$8 25
	" 15 " "			9 00
	" 17 " "			10 00
	" 19 " "			12 00
1531.	Opera Glass, (Bardou's), the same in all respects as 1530, but with triple Object-glasses and Eye-pieces, making twelve lenses in all; exceedingly powerful and perfect definition.			
	Object-glasses, 12 lines in diameter,			13 50
	" 15 " "			15 00
	" 17 " "			17 50
	" 19 " "			20 00
1532.	Opera Glass, (Bardou's Conical), very strong, black metal frames, the tapering bodies covered with the finest Turkey Morocco leather, in soft Leather case. These are very superior and powerful Opera Glasses, and are equally well adapted to Field or Marine use.			
	Object-glasses, 13 lines in diameter,			10 00
	" 15 " "			11 00
	" 17 " "			12 50
	" 19 " "			15 00
	" 21 " "			17 50
1535.	Opera Glass, (Bardou's), tops and cross-pieces all black, tubes and bottoms richly gilt, bodies covered with finest colored leather, in soft Leather case; very superior.			
	Object-glasses, 12 lines in diameter,			12 50
	" 15 " "			13 50
	" 17 " "			15 00
	" 19 " "			17 00
1536.	Opera Glass, (Bardou's), the same in all respects as 1535, with addition of richly gilt trimming at top and bottom of bodies.			
	Object-glasses, 12 lines in diameter,			13 50
	" 15 " "			15 00
	" 17 " "			16 00
	" 19 " "			17 50

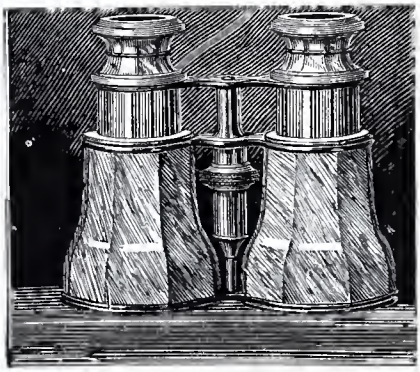
PEARL OPERA GLASSES.

1540.	Opera Glass, (Lemaire's), tubes and cross-pieces richly gilt metal, tops and bodies of the finest pure white Pearl, in fine soft Leather case; elegant glasses.			
	Object-glasses, 11 lines in diameter,			10 00
	" 13 " "			12 00
	" 15 " "			13 50
	" 17 " "			15 00
	" 19 " "			17 50
1541.	Opera Glass, (Lemaire's), tubes and cross-pieces richly gilt metal, tops and bodies of superb iridescent Oriental Pearl, in fine Leather case; magnificent glasses.			
	Object-glasses, 11 lines in diameter,			12 00
	" 13 " "			13 50
	" 15 " "			15 00
	" 17 " "			17 50
	" 19 " "			20 00

No. PRICE.

1542. OPERA GLASS, (Lemaire's), tubes and bottoms of metal, richly gilt, cross-pieces nickel-plated, tops and bodies of rich dark colored Pearl; very elegant, in soft Leather case.

Object-glasses, 13 lines in diameter,				$15 00
"	15	"	"	17 00
"	17	"	"	20 00
"	19	"	"	22 50



Nos. 1540–1545.

1543. OPERA GLASS, (Lamaire's), tops, tubes and cross-pieces all black metal, bodies of black Pearl; very rich, in soft Leather case.

Object-glasses, 13 lines in diameter,				10 00
"	15	"	"	11 50
"	17	"	"	13 50
"	19	"	"	15 00

1545. OPERA GLASS, (Bardou's), tubes and cross-pieces of richly gilt metal, tops and bodies of the purest white Pearl; the most elegant glass in the market, in soft Leather case.

Object-glasses, 12 lines in diameter,				20 00
"	15	"	"	21 00
"	17	"	"	22 50
"	19	"	"	25 00

ALUMINIUM OPERA GLASSES.

The wonderful lightness of this metal admirably adapts it for use in the frames and bodies of *Opera* and *Field Glasses*, no fatigue attending their continued use for hours.

No. PRICE.

1550. OPERA GLASS, ALUMINIUM FRAME, bodies covered with finest black Calfskin or dark-colored Russia Leather, tops and cross-pieces black, tubes and milled edges Bright Metal, in soft Leather case.

Object-glasses, 15 lines in diameter,				$18 50
"	17	"	"	22 00
"	19	"	"	25 00
"	21	"	"	28 50

1551. OPERA GLASS, ALUMINIUM FRAME, bodies covered with finest black Calfskin, tops, tubes and cross-pieces all Bright Metal, very handsome; in soft Leather case.

Object-glasses, 15 lines in diameter,				20 00
"	17	"	"	23 50
"	19	"	"	27 00
"	21	"	"	30 00

No. PRICE

1553. OPERA GLASS, ALUMINIUM FRAME, bodies covered with the finest dark colored Russia Leather, tops, cross-pieces and tubes all of Bright Metal, very rich and elegant; in soft Leather case.

Objeet-glasses,	15	lines in diameter,	. . . . .	$21 00
"	17	"	"	24 00
"	19	"	"	27 50
"	21	"	"	31 00

ALUMINIUM FIELD OR MARINE GLASSES.

1555. MARINE OR FIELD GLASS, ALUMINIUM FRAME, bodies—4⅛ inches long when closed, 5 inches long when fully extended—covered with the finest black Calfskin, tops and cross-pieces black, tubes Bright Metal, with Sun-shades; in stiff Leather case, with sling.

Object-glasses,	19	lines in diameter,	. . . . .	32 50
"	21	"	"	36 00
"	24	"	"	43 00
"	26	"	"	47 50

1556. MARINE OR FIELD GLASS, ALUMINIUM FRAME, the same size as 1555; bodies covered with finest black Calfskin, tops, tubes and cross-pieces all Bright Metal, very handsome, with Sun-shades; in stiff Leather case, with sling.

Objeet-glasses,	19	lines in diameter,	. . . . .	35 00
"	21	"	"	39 00
"	24	"	"	45 00
"	26	"	"	50 00

1557. MARINE OR FIELD GLASS, ALUMINIUM FRAME, bodies—4¾ inches long when closed, 6 inches long when fully extended—covered with the finest black Calfskin, tops and cross-pieces all black, tubes of Bright Metal, with Sun-shades; in stiff Leather case, with sling.

Object-glasses,	19	lines in diameter,	. . . . .	35 00
"	21	"	"	40 00
"	24	"	"	45 00
"	26	"	"	50 00

1558. MARINE OR FIELD GLASS, ALUMINIUM FRAME, the same size as 1557; bodies covered with finest black Calfskin, with Sun-shades, tops, tubes and cross-pieces all Bright Metal, very elegant; in stiff Leather case, with sling.

Object-glasses,	19	lines in diameter,	. . . . .	37 50
"	21	"	"	41 00
"	24	"	"	47 00
"	26	"	"	52 50

1559. MARINE OR FIELD GLASS, ALUMINIUM FRAME, with hinge to adapt for various widths between eyes, the same size as 1555; bodies covered with finest black Calfskin, with Sun-shades, tops, tubes and cross-pieces all Bright Metal; the most elegant glass made; in stiff Leather case, with sling.

Objeet-glasses,	17	lines in diameter,	. . . . .	37 50
"	19	"	"	42 00
"	21	"	"	47 00
"	24	"	"	52 50
"	26	"	"	57 50

SPECTACLES AND EYE-GLASSES.

INTRODUCTION.

In no branch of Surgery has more advance been made of late years than in that department which treats of imperfections in vision. The careful study of the various portions of the Eye, and the introduction of the use of the Ophthalmoscope, have led to many important discoveries, and the Ophthalmic Surgeon, in order to carry out his necessary prescriptions, has rightly demanded of the Manufacturing Optician that he should pay some attention to the Scientific Construction of Spectacles. Nothing tends more to injure the sight than wearing improper glasses, especially concave ones, whilst nothing preserves vision more than the use of suitable ones.

With a view to make this Part of our Catalogue practically useful, we have given herewith short descriptions of the anatomy of the Eye, and of some of the more frequent forms of defective vision which may be assisted by the use of glasses; and for the convenience of persons residing at a distance we have printed a set of Test Types, and have given a series of queries, accurate answers to which will enable us to supply glasses suited to most imperfections of vision, whilst we have also enumerated some of those Complaints for any of which the patient should at once consult the Oculist, whose directions we are always ready to carry out.

The Illustrations, which have been engraved with great care, will give an idea of the various forms and patterns of the Frames of our Spectacles and Eye-Glasses, whilst the quality of the Glasses with which they are glazed is uniformly *First Class* only. We sell no others, at retail. Spectacles should be made to fit firmly on the face without pinching; much of the comfort attending their use depends on their so doing; and the more complete the information given as to the shape of the head, the better are we enabled to suit the patient.

Fig. II.

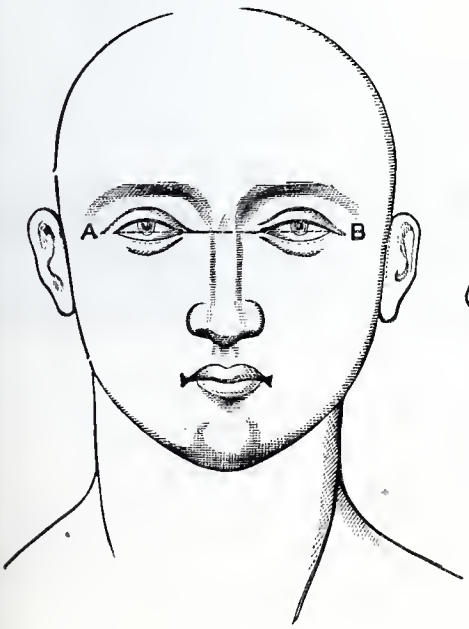
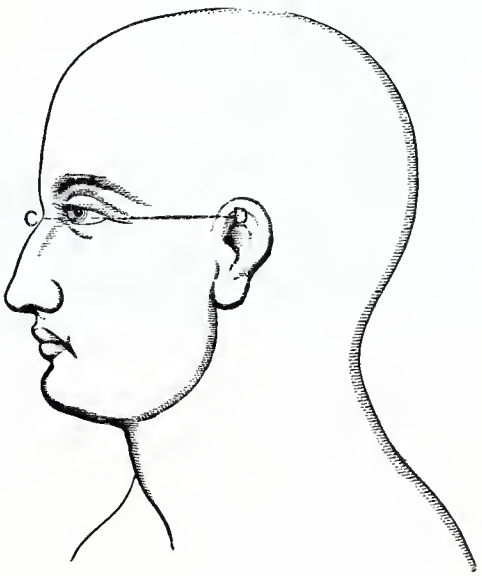
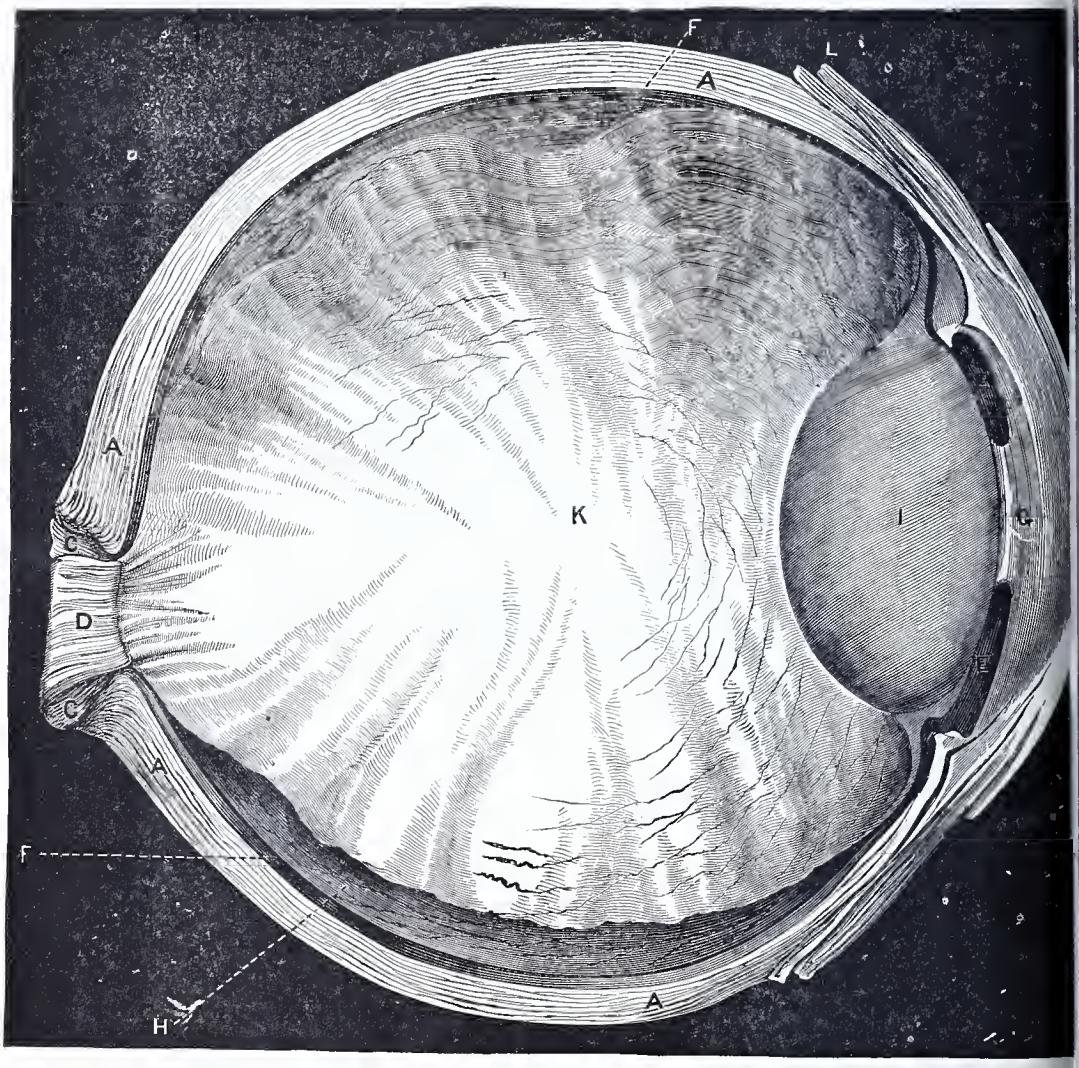


Fig. III.





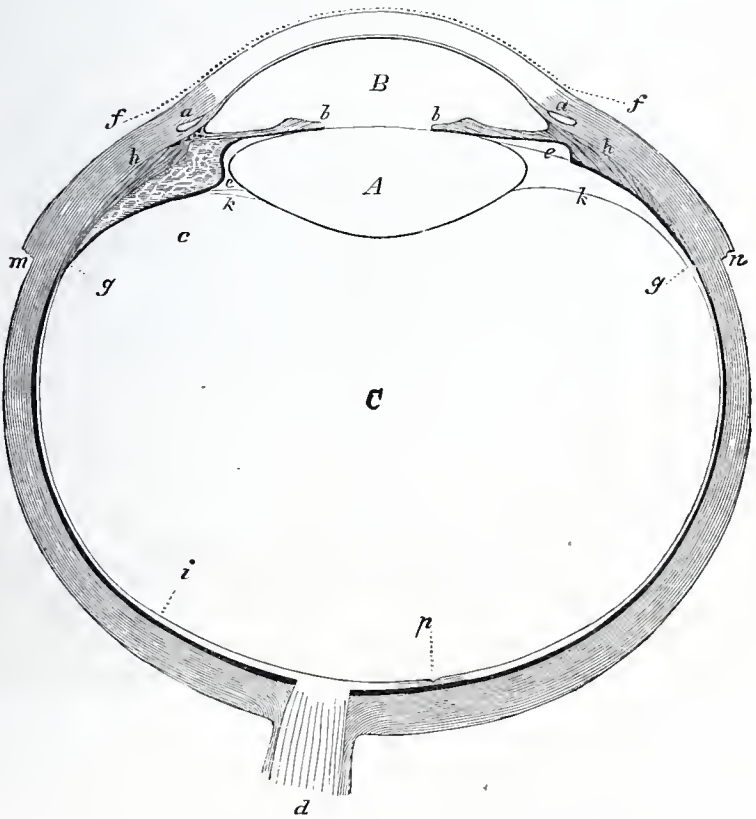
MAGNIFIED VIEW OF A SECTION THROUGH THE MIDDLE OF THE EYE. A, SCLEROTIC COAT; B, CORNEA; I, CRYSTALLINE LENS; K, RETINA; F, CHOROID COAT; D, ENTRANCE OF OPTIC NERVE.

THE EYE.

We undoubtedly derive more of our knowledge of the world about us through the agency of sight, than through any other member of the group of our special senses, but, although of such great importance to us all, there are comparatively few persons who have definite ideas concerning the eye, either as to its structure or the manner in which it aids in the production of vision.

In the following pages will be found a concise description of the eye itself, and explanations of its mode of action in health, together with a brief outline of the abnormal conditions, which we, as opticians, are called upon to treat.

ANATOMY OF THE EYE.



SECTION OF A DIAGRAMATIC EYE (AFTER HELMHOLTZ.)

The shape of the eyeball is nearly spherical, with a diameter of almost one inch; viewed from the side, however, we find it to be composed of parts of two spheres, the smaller one being formed of the transparent cornea (F), which projects forward, as may be readily seen in looking at any eye from the side.

The eye is provided with six muscles: two pulling it to the right or left, two up or down, while the remaining two rotate the ball obliquely, at the same time drawing it either up or down. Each eye is provided with its own set of muscles but these act in unison, thus causing both eyes to be directed simultaneously to any object which we view.

f. *The Cornea.* This is the transparent front, through which the "color" of the eye is seen; although it appears clear and structureless, yet under the microscope it shows a complicated structure. The cornea is the first part of the refractive system of the eye.

m. *The Sclerotic* coat is the thickest tunic or covering of the eyeball, and forms the "white" of the eye. It is a tough, elastic membrane, and is well calculated to give form to the organ and protection to the more delicate parts within.

b. *The Iris* is a thin, muscular curtain which hangs in front of the lens (A), and serves the purpose of a diaphragm, cutting off all superfluous light. It is perforated in the centre, thus leaving a circular opening known as the "*Pupil.*" The iris is variously tinted, thus causing the diversity in the "color" of eyes; the pupil forms the "black" of the eye. As the iris contracts the pupil becomes smaller, and, on the contrary, as the former dilates, the latter enlarges; this change in size being regulated by the amount and intensity of the light which passes into the eye—the greater the amount of light, the smaller the pupil.

g. *The Choroid* coat is the second tunic of the ball; it is quite thin, and it is the vascular coat of the eye, containing hundreds of minute tortuous blood-vessels. On its inner surface it is covered with a dense layer of black pigment, which absorbs all light which falls upon it, and thus prevents reflection. In many animals, as the cat, tiger, etc., a certain portion of the choroid, called the tapetum, is devoid of this pigment, and has a metallic lustre instead; the reflection of light from this spot gives rise to the well-known glare of the eyes of these animals when approached with a light in the dark.

A. *The Crystalline Lens* is a perfectly transparent, highly refractive body, shaped like a biconvex lens, with the curve of its posterior surface slightly greater than that of the front; it is supported between the iris and the vitreous humor. The lens is capable of having the convexity of its surfaces increased or diminished by the action of the ciliary muscle (H), which change is of the greatest importance, since it enables us to "accommodate," that is, to see far and near objects equally well.

h. *The Ciliary* muscle is a delicate band of muscular tissue, which forms a complete circle, lying just behind the iris. Although small and insignificant in appearance, it is a very essential part of the eye, as by its action, contracting now more, then less, the convexity of the lens is increased or diminished according to the necessity of the moment.

B. *The Anterior Chamber* is the space between the cornea in front, and the iris and lens behind. It is filled with a clear fluid, known as the *aqueous humor.*

C. *The Vitreous Humor* is a transparent, colorless, gelatinous mass, occupying the portion of the ball back of the iris; its principal function is to aid in bringing rays of light to an accurate focus on the retina, and also to contribute to the solidity of the eye.

i. *The Retina* is the nervous portion of the visual organ, and is the part on which the pictures of external objects are received, and thence transmitted through the *optic nerve* (D), to the brain. It is, in health, a very delicate, transparent membrane, of a very highly complicated and intricate structure, in which

very minute nerve fibres from the *optic nerve* and cells form an important part. Not all portions of the retina are equally sensitive, but at one point only—the *macula lutea*, or yellow spot, (p), are sharp and distinct images of objects formed, and, in order to obtain clear images, we instinctively direct our eyes so that the rays coming from the object fall exactly on this sensitive spot.

After having thus briefly considered the structure of the eye, a few remarks on the part which it plays in producing distinct vision, may not be amiss.

The rays of light coming from any object on this earth are, in reality, divergent, since only rays coming from an infinite distance are parallel; practically, however, all rays coming from objects 20 feet or more away may be considered as *parallel;* those coming from objects nearer than 20 feet are *divergent.*

From an optical standpoint, and that one we have chiefly to consider, the eye is but a camera obscura or dark chamber; in principle, just the same as the one employed by the photographer. The refractive media of the eye—cornea, aqueous humor, lens and vitreous body—form the lens of the camera; the iris, the diaphragm; the interior of the eye, the camera itself; and the retina, the sensitized plate. Since the cornea and aqueous humor, and the vitreous humor are almost identical in refractive power, we can consider the refractive system of the eye as a simple biconvex lens. Now, glancing at the cut, we see the course of the rays of light from external distant objects till they fall on the retina.

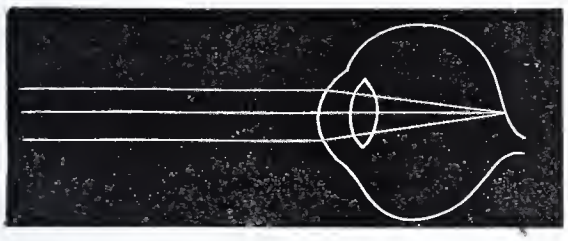


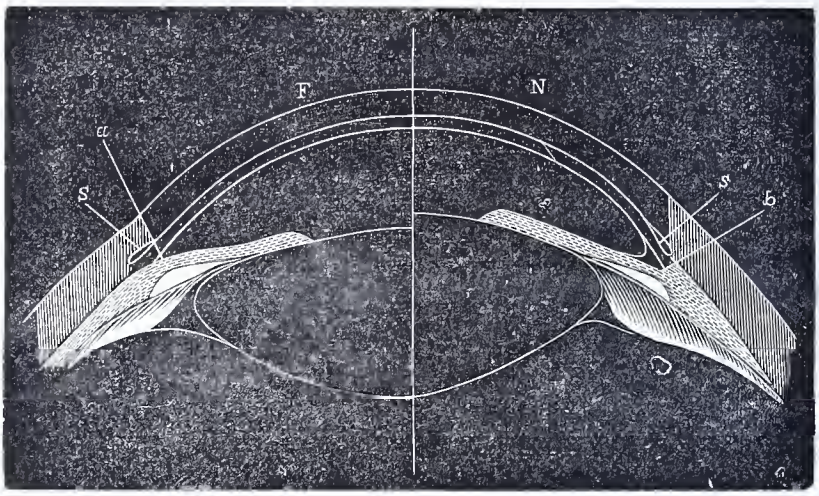
DIAGRAM OF NORMAL EYE.

The parallel rays coming from some distant object, fall on the cornea, pass through the lens and are bent from their course so that they come to a focus on the retina, where a distinct image is formed, and the visual impression conveyed to the brain by the optic nerve.

It is evident, that rays coming from an object, say 20 feet away, and those from an object 20 inches, cannot be brought to a focus at the same point by the same lens, and so it would be with our eyes had we not the power of increasing or diminishing the convexity of our lenses. This change is constantly taking place without our knowledge, if our eyes be healthy, but that it actually does take place is easily proven.

If a piece of netting be held 12 or 14 inches in front of the eyes, and the gaze be fixed intently on some distant object, as long as this is clearly seen, the meshes of the netting will be indistinct; while if these be accurately seen, the distant object is no longer clearly in view; in other words, in bringing our gaze from the far to the near object there has been a change in convexity of our lenses, this being greater for near and less for distant objects.

This power of changing the form of the lens by the action of the ciliary muscle, is known as the "accommodation," while that of bringing the rays of light to a focus on the retina is called the "refraction" of the eye.

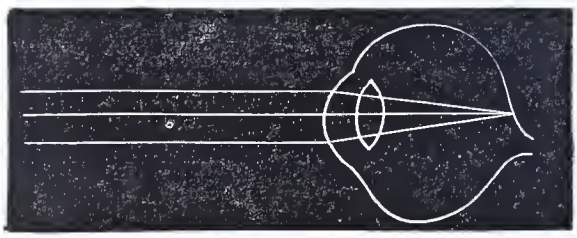


This alteration in the curvature of the lens is shown in the cut, which represents a horizontal section of the anterior part of an eye, the left half of the figure represents the eye when accommodated for distant objects; the right half, when adjusted for small print held as close as possible.

The conditions of the eye which necessitate the use of glasses in order to obtain perfect vision are either those of imperfect refraction or accommodation.

In regard to the state of the refraction, or of the power of bringing rays of light to a focus on the retina, all eyes may be classed under one of three heads: Emmetropic or normal, Myopic or near-sighted, and Hypermetropic.

THE EMMETROPIC EYE.



EMMETROPIC EYE.

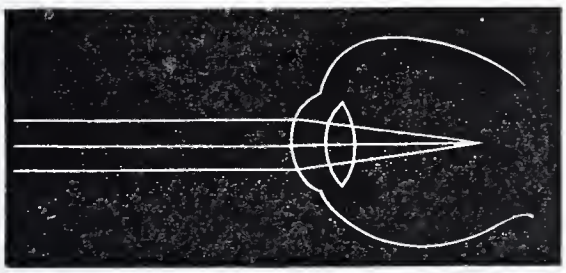
In the Emmetropic or normal Eye, the rays from a distant object are brought to a focus exactly upon the retina, thus giving a distinct image without any artificial aid.

In order to ascertain whether an eye be normal in respect to its optical performance, certain tests are employed, similar to those given on pages 110–111. A normal eye should be able to distinguish readily the letters of No. X at 10 feet, or those of No. XX at 20 feet; this test determines the "acuity" of vision. The condition of the accommodation must next be tested; this is done by finding the *nearest* and *farthest* points at which type as No. 1 can be *distinctly* seen; this gives the "near" and "far" points.

The "far" point remains fixed until about the 45th year, when it gradually recedes. The "near" point, on the contrary, is changing constantly with the advance of life. A child of 10 years should be able to read No. 1 as close as 2½

or 3 inches; a man of 21 years, at 3½ to 4 inches; one of 40 years, at 8 or 9 inches; while a person of 60 years will not be able to see print closer than 24 or 30 inches.

MYOPIA; OR NEAR-SIGHTEDNESS.



MYOPIC EYE.

It has already been stated that this defect depends upon the refractive condition of the eye; it is that condition in which the rays from distant objects come to a focus *in front* of the retina, and consequently the latter receives but the blurred and indistinct image of external objects. A glance at the cut will explain this. Myopia is usually due to an abnormal lengthening of the eyeball, thus causing the retina to recede from the point where the rays come to an accurate focus. It is a disease which often exists from birth, and is frequently hereditary; but, although frequently this condition is present from birth, and manifests itself in later life, no doubt, many cases are developed by excessive use of the eyes at fine "near work," such as reading or sewing, before the coats of the eye have become fully developed and hardened. Statistics show that the percentage of Myopia increases in proportion to intellectual development, and, that while it may be quite small in the lowest grades of schools, it steadily gains in numbers as the course of study becomes higher, until, in the colleges and universities it reaches a very large percentage.

Among the prolific causes of the development of this disease, is the habit of reading with the head bent forward and over the book, thus preventing the free circulation of the blood, and causing a congestion of the eyes, which tends still further to stretch the coats of the perhaps already weakened organ. The habit of reading with insufficient illumination, or in a reclining posture, is also most injurious.

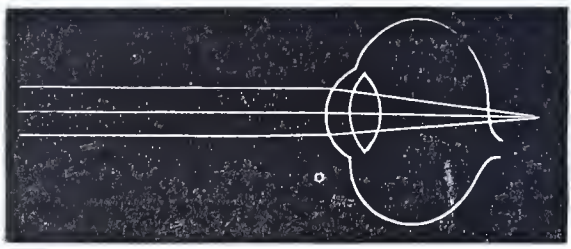
The popular belief that near-sighted eyes are strong ones is not only absolutely incorrect, but also most mischievous, since there is no state of the eye which more urgently demands the use of a proper glass, than does Myopia. Such eyes instead of being strong, are not only absolutely weak, but they are sick eyes, and, if the defect be of a high degree, liable to the most serious accidents, which may result in loss of sight. The danger lies not in the imperfect vision, but in the intercocular changes which accompany the defect in its higher grades, and which often are progressive.

Myopic eyes are often very prominent ones, seeming too large for their sockets. Indistinct distant vision, and in reading, holding the print close to the eyes, are the chief symptoms of this defect.

The treatment of near-sightedness is the use of the proper *concave* glasses. By this we hope to attain two objects. The rays are brought to a focus on the retina, and thus distinct vision is insured; and, by wearing the proper glasses, the disease may usually be arrested. In cases where the defect is slight, the cor-

reeting-glasses can be given by a good optician, care being taken to select the *weakest* concave lens with which vision is normal; where, however, the defect is high, the advice of an oculist should be sought, who, after careful measurement, will prescribe the proper glasses. These, with the strict observance of the hygienic conditions in regard to posture and illumination, will usually check the progress of the disease.

HYPERMETROPIA.



HYPERMETROPIC EYE.

This defect is dependent on a condition of the eye exactly the reverse of Myopia. It is the condition in which the rays from distant objects come to a focus *behind* the retina. A glance at the cut will explain this condition. Hypermetropia is due to a formation of the eye, which is present from birth. It is also hereditary, being transmitted through entire families. Hypermetropic eyes are usually flat and shallow in appearance.

Although present from birth, it is often, unless of a high degree, not manifested until the duties of the school-room begin, and, in the slighter grades, it may not be noticed until adolescence or middle-life; nevertheless, the defect has existed all the while, but it has been masked and overcome by the exertions of the little ciliary muscle. Distinct vision is one of the instincts of our senses, and our eyes unconsciously adjust themselves so as best to secure it. As we have before seen, any change of the convexity of the lens is effected by the action of the ciliary muscle; now, since the focus for the rays falls behind the retina, the convexity of the lens of the eye must be increased in order to bring the focal point on the retina, and hence the little muscle is called upon to do the work; but, since this condition of the eye is permanent, so also this muscular contraction is almost constant while the eyes are employed. Besides this constant exertion, the muscle must also act with vigor enough to give the ordinary power of accommodation for near objects.

In youth the ciliary muscle is in its greatest vigor, and it then overcomes this defect even when of considerable degree, but as age advances the power of the muscles diminishes, and then it is that the defect begins to manifest itself.

The boy has passed through school without the slightest cause to suspect himself the possessor of hypermetropic eyes; college is entered, and increased study is necessary. After reading for some time, he now experiences a sense of fatigue about the eyes; he stops and passes his hand across his closed eyes for a few moments, then resumes his study; after a few minutes the same is repeated; in a few months, he is, perhaps, troubled with headaches and pains across the brow and above the eyes; these themselves feel heavy and ache after the duties of the day, and so the symptoms progress until a half-hour's study is purchased at the price of hours of discomfort.

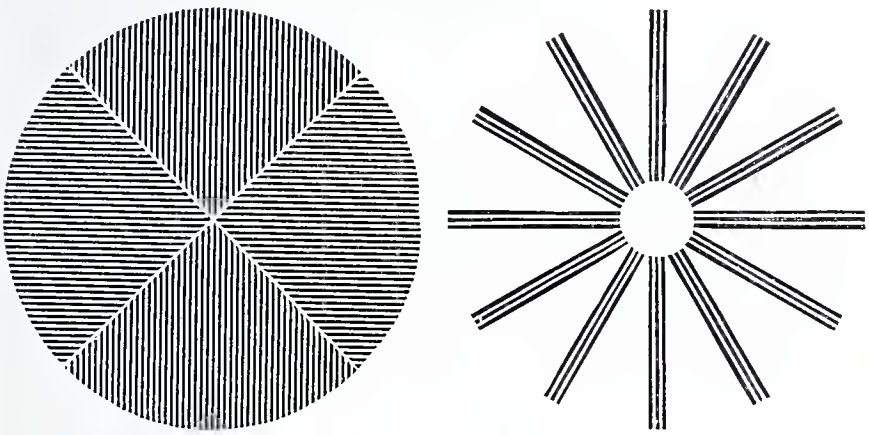
In the higher degrees of Hypermetropia, reading, or other fine work, is often impossible for periods of longer than a few minutes, the page becoming misty, the letters running into each other, and everything appearing blurred.

The cause of all these symptoms is the overstrain and eventual exhaustion of the ciliary muscle. So long as it is able to accomplish its excessive task, it overcomes, or rather masks the defect, but as soon as its powers gives out, the accommodation fails and indistinctness of near objects results, in addition to which we have the long train of distressing symptoms which arise from the overstrain; many an obstinate headache has its source in an unrecognized Hypermetropia!

Since in this state of the eye the focus falls behind the retina, the remedy is found in a glass which will increase the refractive power of the eye, thus bringing the focus of the rays of light *on* the retina: such a result is obtained by the proper *convex* glass. As, however, the ciliary muscle is able to mask a certain amount of the defect, even after it has become apparent, the convex lens which most improves distant vision, will correct but the portion of the Hypermetropia which is "manifest," and, indeed, frequently the patient may reject all convex glasses as failing to improve his distant vision, and yet be hypermetropic to a considerable degree.

The glass which corrects the manifest defect will often greatly conduce to the patient's comfort, yet to select the glass which will correct the entire defect, the accommodation of the eye must be temporarily suspended by putting the ciliary muscle at rest by means of a solution of atropia, when the entire defect becomes apparent and may be carefully measured by the oculist.

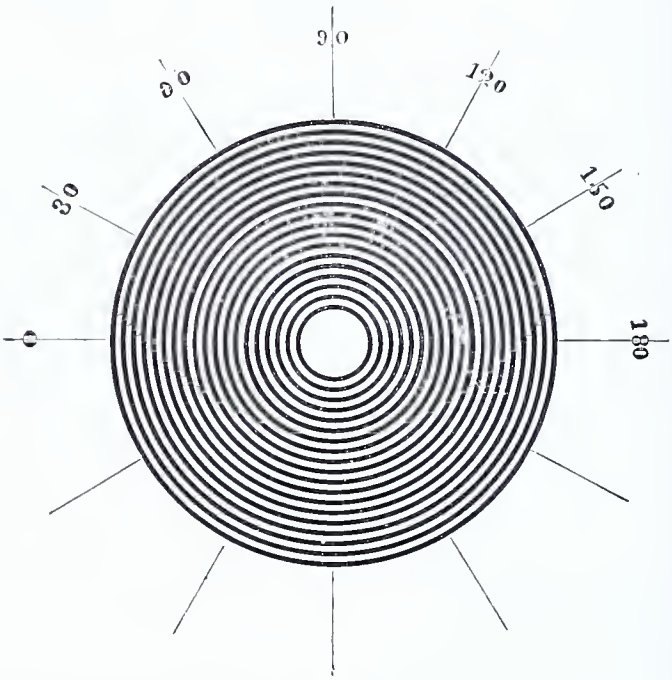
ASTIGMATISM.



Although this defect is very common, yet not until the last few years were its frequency and importance fully recognized. Astigmatism is a condition in which the curvature of the cornea varies in the different meridians. On examining an ordinary lens we find that all parts of its surface have an equal curvature, and so it should be in a normal cornea; but in an astigmatic eye it is not so, since the vertical curvature differs from the horizontal, thus producing asymmetry of the refractive part of the eye, and, as a result, rays falling on such an eye are not all brought to a single focus, but those in one meridian fall either before or behind the retina, or focal point of the other meridian, thus causing a confused and indistinct picture of the object viewed. Astigmatism is either Myopic or Hypermetropic; it may also be "mixed"—the eye being Myopic in one, and Hypermetropic in another of its meridians.

Vision in astigmatic eyes is usually impaired both for distant and near ob-

jects, since at no point can a distinct image be obtained; but the distinguishing feature of this defect is the fact that certain groups in a series of lines and circles, such as represented in the figures on pages 105 and 106, are seen with more distinctness and blackness than any others. Astigmatism has frequently



been discovered by looking at a clock, it being noticed that when the hands were at certain figures, say III and IX they were seen with difficulty, while when at VI or XII they were distinctly seen.

In the treatment of Astigmatism, recourse must be had to *cylindrical lenses*, as the ordinary lenses would not correct the defect. Since the correcting glasses for Astigmatic eyes are frequently combinations, these lenses are always ground according to formula to correct the defect of each individual eye, which can only be determined after careful measurement.

PRESBYOPIA.

Presbyopia, "far sight," or "old sight," is an accompaniment of the later years of life; it is a physiological or natural, not an abnormal change, and affects all eyes.

This condition depends almost solely upon the failure of the accommodation, due to a gradual hardening of the lens and decrease of the power of the ciliary muscle as age advances. Although this decrease in the power of adjustment for near objects is not noticed until, perhaps, the 40th or 45th year, yet, from the age of nine or ten, the accommodation is gradually growing weaker, that is, fine print can no longer be seen as close to the eye as formerly.

As soon as the "near point" for small type passes beyond 8 inches, we consider Presbyopia to have set in.

Difficulty in reading fine print or in threading the needle at night are among the first symptoms usually noticed; the page must be held further from the

eyes, and more strongly illuminated; while small type is with difficulty seen. These symptoms usually first show themselves at night, while reading or working by artificial illumination, but gradually they manifest themselves likewise in the daytime.

All eyes undergo these changes producing Presbyopia; we frequently, however, hear of persons, ripe in years, who have never felt the neeessity of glasses for reading or other fine work, and whose "strong" eyes are their especial pride. Such persons have been near-sighted, probably, all their lives, their defect neutralizing the normal changes taking place; a weak eoneave glass before such eyes will usually improve distant vision.

The popular opinion that the use of glasses should be postponed as long as possible, is erroneous. As soon as unpleasant feelings denote the approach of Presbyopia, glasses should be resorted to at once, as the longer the eyes are deprived of the aid which they need, and eonsequently are subjected to strain, the more rapidly will the changes in the eye become developed.

The treatment of Presbyopia is found in convex glasses, of sueh strength that fine print may be seen readily at 7 to 8 inches. Here sueh a glass is employed not to correct the refraction, as in the case of the eonvex lenses in Hypermetropia, but to aid the power of the eye in aceommodating. Presbyopia, in a perfectly healthy eye, does not affect the sharpness of distant vision, although in extreme old age, distant vision also is somewhat diminished, owing to other changes which affeet the eye.

The glasses should be used at first only while reading by lamp or gaslight. When the unpleasant sensations show themselves also in the day-time, then the glasses previously worn at night should be used for reading by daylight, and their place supplied by a pair of slightly stronger glasses for night-work. In old persons, when distant vision is improved by weak eonvex glasses, those of the proper strength may be worn constantly.

MUSCULAR AFFECTIONS.

Besides the defect depending upon refraction and aeeommodation, there is a group of eye troubles caused by a want of harmony in the actions of the various muscles by which the eyes are moved, some of which eonditions are greatly benefited by the use of a properly ground glass.

The most frequent condition giving rise to fatigue and weariness of the eyes when used at near work, is that in which there is a want of balance between the power of the muscles which move the eyes outwards, and those whieh draw them together, the latter museles being too weak to accomplish their task without fatigue; this eondition is technically termed Insufficiency of the Interni.

Benefit is usually derived from wearing glasses on which are ground prisms, with their bases turned towards the nose, by means of whieh the image is displaeed, it appearing to be further away, and consequently not requiring the eyes to be eonverged to the same degree as without them. This condition is also very frequently assoeiated with one of the defeets whieh we have already deseribed; it is then aided by having the glass so ground as to eombine the aetion of both lens and prism.

When there is an absolute breach in the harmony between the muscles, we have Diplopia, or double vision, produced; two images of objects being seen, owing to the pictures of the objeets falling on dissimilar points of the retina of eaeh eye.

This eondition usually is due to the failing of the power of one or more museles, and it often denotes very grave disease, situated in the brain or nerves. Under such circumstances, it is evident that the treatment must be

directed to the deep-seated cause of the disease, and that local means as applied to the eye can only relieve, not cure.

When the double images are very marked, by wearing a shade or opaque glass over one eye, we obviate this very annoying symptom; where the images are but very slightly separated, the temporary use of a proper prismatic glass will afford relief.

NOTE.—We are indebted to the courtesy of Dr. C. S. Fenner, of Louisville, Ky., for the use of illustrations on pages 101, 102, 103 and 104, which are taken from his valuable work, entitled "Vision, Its Optical Defects, and the adaptation of Spectacles." (No. 1028 of this Catalogue.)

TEST-TYPES.

The following "Test-Types" will enable persons to give information that will greatly assist us in supplying glasses suited to their sight:—

The paper should be held with a good light falling upon it: if by daytime, the person should place himself with his back to a window; or if by artificial light, with the full illumination falling on the page, but not on the Eyes.

PARTICULARS REQUIRED BEFORE SUPPLYING GLASSES.

What is the extreme distance in feet and inches at which you can read Test-Types Nos. 1, 2, 4, 6, 10, 20, 40?

Have you ever used glasses before?

If so, did they make your eyes ache?

Are the Spectacles required for Reading or Walking?

What is the distance from the outside corner of one eye to the outside corner of the other, measured with a tape across the nose? (Form A to B, page 97, fig. II.)

What is the distance from the middle of the bridge of the nose to the top of the ear? (From C to D, page 97, fig. III.)

Is the bridge of the nose prominent or not?

AN ASCENT TO THE SUMMUT OF MOUNT BLANK.

No. 1.

THIS TYPE SHOULD BE READ AT A DISTANCE OF 1 FOOT.

An Assent to the Summut of Mount Blank.—It was on the 1st of August—I remember by my wags cumming dew, and I wanted to be riz,—that Me and master maid our minds up to the Mounting. I find Master as oppend an account with the Keep Sack—but as that is a cut abov, and rit in by only Lords and Laddics, I am reduced to a Peer in the pagis of the Comick Anual—Mr H giving leaves.

Wile we waited at Sham Money, our minds servd tims misgiv, but considdring only twelve Gentlemen and never a footmun had bin up, we determind to make ourselves particler, and so hizhered gides to sho us up. For a lonz tim the whether was dout full weather — first it snew — then thew — and then friz—and that was most agreeabl for a tempting. The first thing I did was to change my blew and wite livry, as I guest we shood have enuf of blew and wite on the mounting—but put on a dred nort for fear of every thing—takin care to hav my pokets well cramd with sand witches, and, as proved arterwards, they broke my falls verry much when I slipd on my bred and sins. The land Lord was so kind as lend me His green gaws tap room blind for my eyes, and I recumend no boddy to go up any Snowhill without green vales—for the hice dazls like winkin. Sum of the gides wanted me to ware a sort of crimpt skaits,—but thought my feet would be the stifer for a cramp on—and declind binding any think xcept my list garters round my Shews. I did all this by advice of John Mary Cuthay the Chief Gide, who had bin 8 tims up to every think. Thus a tird we sit out, on our feat, like Cupting Paris, with our Nor poles in our hands —Master in verry good sperrits, and has for me I was quit ellivatted to think what a figger the Summut of Mount Blank wood cut down the airys of Portland Plaice.

No. 2.

THIS TYPE SHOULD BE READ AT A DISTANCE OF 2 FEET.

Arter sliping and slidding for ours, we cum to the first principle Glazier. To give a correct noshun, let any one suppose a man in fustions with a fraim and glass and puttey and a dimond pensel, and it's quit the revers of that. It's the same with the Mare of Glass. If you don't think of a mare or any think maid of glass you have it xactly We was three ours gitting over the Glazier, and then come to the Grand Mullets, ware our beds was bespoak—that is, nothing but clean sheats of sno,—and never a warmin pan. To protect our heds we struck our poles agin the rock, with a cloath over them, but it looked like a verry litle tent to so much mounting. There we was,—all Sno with us Sollitory figgers atop Nothink can giv the sublime idear of it but a twelf Cake. The Gides pinted out from hear the Pick de Middy, but I was too cold to understand Frentch—and we see a real Shammy leeping, as Master sed, from scrag to scrag, and from pint to pint, for vittles and drink—but to me it looked like jumpin a bout to warm him self. His springs in the middel of Winter I realy beleave as uncredible. Nothink else was muving xcept Havelaunches, witch is stupendus Sno balls in high situations, as leaves their plaices without warnin, and makes a deal of mischef in howses and families. We shot of our pistle, but has it maid little or no noise, didn't ear the remarkably fine ekko.

No. 3.

THIS TYPE SHOULD BE READ AT A DISTANCE OF 3 FEET.

We dind at the Grand Mullets on cold foul and a shivver of am, with a little O de Colon, agen stomical panes. Wat was moor cumfortble we found half a bottel of brandcy, left behind by sum one before, and by way of return we left behind a little crewit of Chilly Viniger for the next cummer, whoever he mitc bc or not. After this repass'd, we went to our subblime rests, I may say, in the Wurld's garrits, up 150 pare of stares. As faling out of Bed was dangerus, we riz a wal of stons on each side. Knowing how comfortble Master sleeps at home, I regretted his unaccommodation, and partickly as he was verry restless, and evry

No. 4.

THIS TYPE SHOULD BE READ AT A DISTANCE OF 4 FEET.

tim he stird kickd me about the Hed. I laid awack a good wile thinking how littel Farther, down in Summerset Sheer, thoght I was up in Mount Blank Sheer; but at long and last I went of like a top, and dremt of Summuts. Won may sleep on wus pillers than Nap Sacks. Next mornin we riz erly, having

No. 5.

THIS TYPE SHOULD BE READ AT A DISTANCE OF 5 FEET.

still a good deal to git up, and skrambled on agin, by crivises and crax as maid our flesh crawl on hands and nees to look at. Master wanted to descend in a crack, but as he mite not git up in a crack agin, his letting himself down

No. 6.

THIS TYPE SHOULD BE READ AT A DISTANCE OF 6 FEET.

was unrecomended. Arter menny ours work, we cum to the Grand Plato. Master called it a vast Amphi-Theater; and so it is, except Du-Crow and the Horses and evry thing. Hear we brekfisted, but

No. 7.

THIS TYPE SHOULD BE READ AT A DISTANCE OF 7 FEET.

was sirprizd at our stomicks not having moor hedges, Master only eting a Chickin wing, and me only eting all the rest.

No. 10.

THIS TYPE SHOULD BE READ AT A DISTANCE OF 10 FEET.

We had littel need to not eat, --- the most uneasy part to go

No. 20.

THIS TYPE SHOULD BE READ AT A DISTANCE OF 20 FEET.

SLIDING TELISCOPES ROE
OF THE ICE WE CUM AGIN

No. 40.

THIS TYPE SHOULD BE READ AT A DISTANCE OF 40 FEET.

LORD ASKD
OUR NAME

No. 50.

THIS TYPE SHOULD BE READ AT A DISTANCE OF 50 FEET.

A BOIK
BY Mr.

TO OCULISTS.

Having unsurpassed facilities for the careful and accurate filling of prescriptions of all characters, *at the shortest notice*, and at *prices much more reasonable* than those heretofore prevailing, we solicit the same of you, with our guarantee of giving perfect satisfaction.

We glaze cylindrical and prismatic lenses to Eye-glass frames of any form, and in order to allow your patients at a distance to choose what may suit their fancy, will send by mail several pairs for selection.

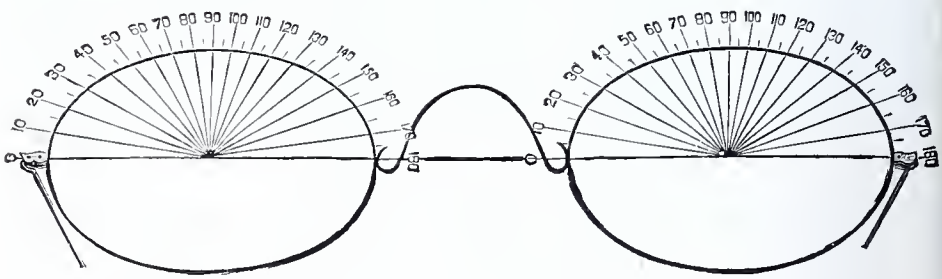
We will also furnish to Oculists blank prescription papers as below, which will merely require filling up with the figures of the formula and name of the tient.

PHILADELPHIA, ... 187

PRESCRIPTION FOR SIGHT.

FOR .....

.....

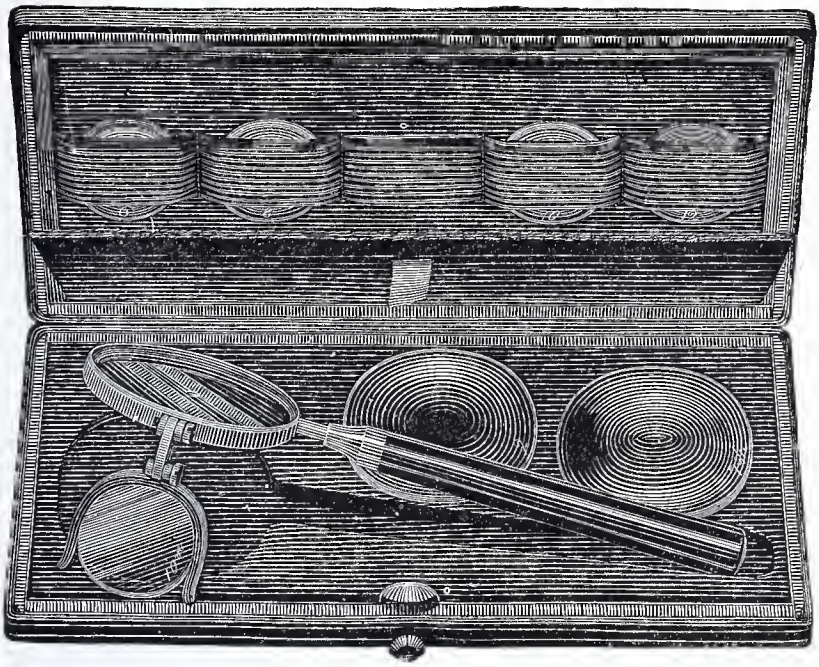


DISTANCE. R.=

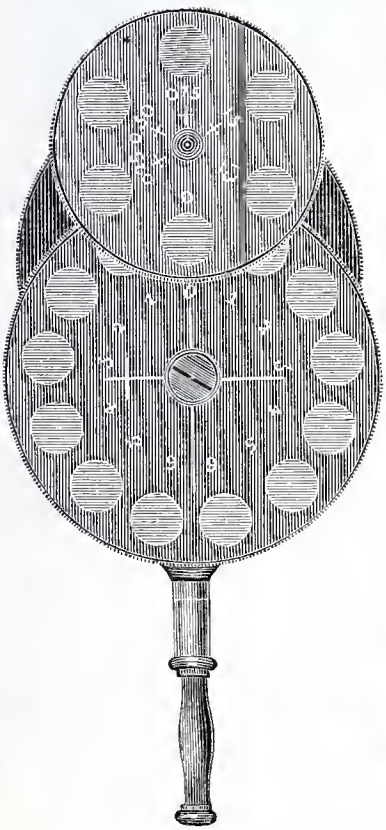
L.=

READING. R.=

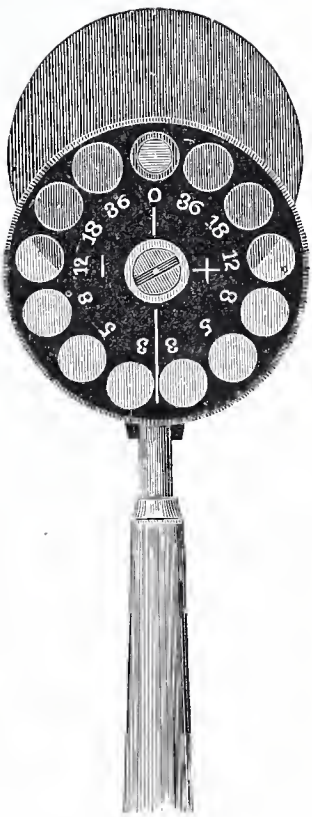
L.=



No. 2010.



No. 2011.



No. 2015.

No. PRICE.

2000. THE HUMAN EYEBALL, Enlarged Size, the upper portion of which (containing a microscopical representation of the layers of the retina,) is to be taken off, when the cornea and iris, the lens and the vitreous body may be taken out, ... $6 50

2005. DR. PERRIN'S MODEL OF THE EYE, for the practice and study of the *Ophthalmoscope*, with twelve colored shells, representing normal and diseased conditions of the eye, as seen with that instrument. Packed in handsome Morocco case, ... 25 00

2010. LIEBREICH'S OPHTHALMOSCOPE, with two convex condensing lenses, and a series of five lenses of different foci, fitted to an arm behind the perforated mirror; in Morocco case, ... 5 00

2011. DR. BADAL'S OPHTHALMOSCOPE, with two mirrors 1¾ inches in diameter, two revolving discs at back of mirror, one containing lenses Nos. 1, 2, 3, 4, 5, 6, both convex and concave; the other lenses 0.25, 0.50, 0.75 and 13 convex and 13 concave all of the Dioptric System, the discs arranged to be used in combination; with a double convex condensing lens in frame; all contained in a neat Morocco case for the pocket, ... 16 00

2012. DR. KNAPP'S OPHTHALMOSCOPE, with two mirrors, 1½ inches in diameter, with revolving disc containing fifteen lenses, eight convex from 2 to 48 inches focus and seven concave from 4 to 48 inches focus, with condensing lens; in Morocco case, ... 17 50

2015. LORING'S OPHTHALMOSCOPE, with mirror 1¼ inches in diameter, and revolving disc at back containing twelve lenses, six each convex and concave, of 3, 5, 8, 12, 18, 36 inches focus; double convex condensing lens 1½ inches in diameter in hard rubber frame; in Morocco snap case, ... 14 00

2016. LORING'S OPHTHALMOSCOPE, similar in form and size to No. 2015, with one mirror and one condensing lens, and a series of ten convex and eleven concave lenses of the Dioptric System, set in a revolving disc, covered with metal to preserve them from dust, . 17 50

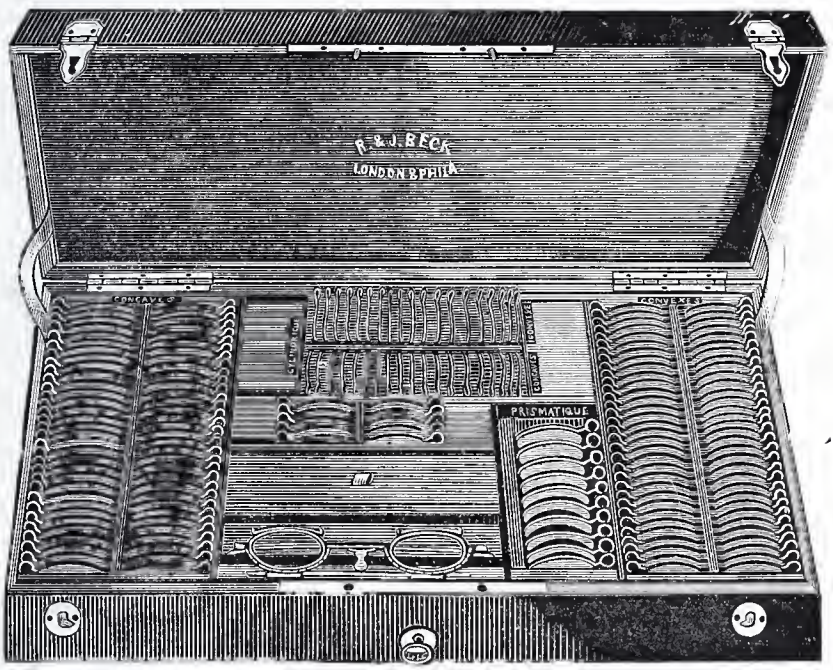
2017. LORING'S OPHTHALMOSCOPE, similar in size and form to the preceding, but with two mirrors, two condensing lenses of 2½ and 3 inches focus, and three revolving discs containing a series of twenty-three lenses, convex and concave, from 2 to 60 inches focus, of the Inch System, ... 25 00

2018. BECK'S IMPROVED LIEBREICH'S OPHTHALMOSCOPE, with chin-rest, rack and pinion adjustment for height of instrument from table, and Lamp with two chimneys and shade; in Mahogany case, . 40 00

2019. BECK'S IMPROVED ADJUSTING BINOCULAR OPHTHALMOSOPE, in fine Morocco case, ... 32 50

Other styles of Ophthalmoscopes will be illustrated in the next Edition of this Catalogue.

TRIAL SIGHTS.



No. 2020.

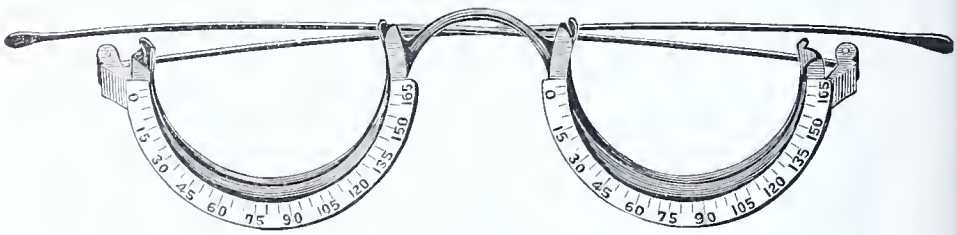
No.		Price.
2020.	NACHET'S COMPLETE SERIES OF TRIAL SIGHTS, comprises 32 *pairs each* of Spherical convex and concave lenses from 2 to 72 inches focus; 19 *pairs each* of plane Cylindrical convex and concave lenses from 6 to 60 inches focus; 9 Prisms, of angles from 2 to 10 degrees; 4 plane *colored* glasses; 1 *white* glass disc; 1 half-ground surface; 2 metal discs, with stenopaic slit; 1 metal disc, with hole, and one ditto solid; 1 adjustable spectacle frame with revolving graduated fittings for holding the various lenses; and one ditto not graduated. The whole packed in a first-class Morocco-covered or Rosewood case, with lock, ...		$125 00
2021.	NACHET'S SERIES OF TRIAL SIGHTS, the same in all particulars as 2020, excepting the cylindrical lenses, which are single and not in pairs, ...		100 00
2022.	SERIES OF TRIAL SIGHTS, mounted and packed precisely the same as Nachett's, Set No. 2021, containing the same number of lenses, spherical and cylindrical, with two adjustable trial frames, one graduated to 180° (No. 2030), in Rosewood case, ...		85 00
2023.	SERIES OF TRIAL SIGHTS, mounted the same as the preceding, consisting of 27 *pairs each* of spherical convex and concave lenses from 2 to 72 inches focus; 12 *each* convex and concave cylindrical lenses, from 8 to 60 inches focus; 7 prisms of angles from 2 to 10		

No. | Price.

degrees; 3 *plane*, colored glasses; 1 *white* glass disc; 1 half-ground ditto; 1 metal disc with hole in centre; 1 ditto with stenopaic slit, and one adjustable trial frame, No. 2030; the whole packed in a Morocco covered case, with clasps, ... $70 00

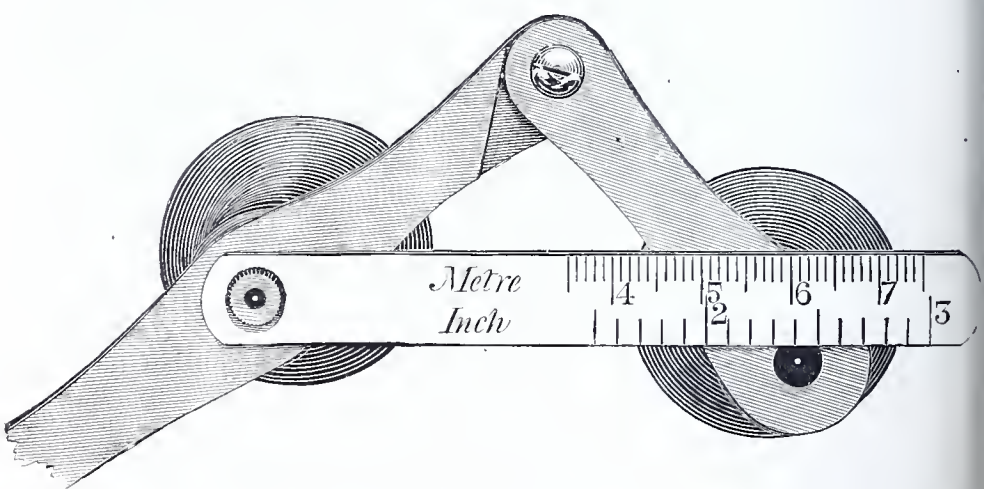
2024. Series of Trial Sights, consisting of 23 *pairs each* of spherical convex and concave lenses, from 2 to 72 inches focus; 12 *each* cylindrical *convex* and *concave* lenses, 8 to 60 inches focus; 6 *prisms* 2 to 10 degrees; 2 metal discs; 1 plane glass; 1 ground glass, all mounted in neat metallic frames; 3 colored glasses, and a graduated frame for holding the various lenses; tho whole packed in polished Mahogany case, ... 55 00

Any of the foregoing Series of Trial Sights can be furnished in either the dioptric or inch systems of numbering.



No. 2030.

2030. Trial Spectacle Frame, with double grooves to each eye, graduated to 180°. Any desired combination of spherical and cylindrical lenses can be adjusted in a moment to this frame, and given to the patient for trial, ... $5 00



No. 2033.

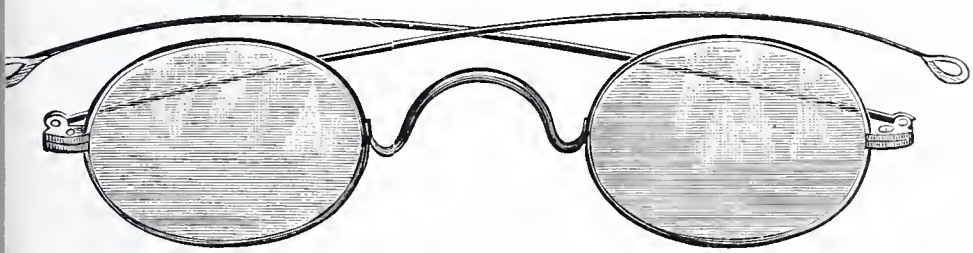
2033. Adjusting Cone, for Measuring the Distance between the Eyes. Holding the instrument in the right hand, a *distant* object should be looked at with the right eye through the hole in the

No.		Price.
	right hand cone; the other cone, fixed to an adjusting arm, should be moved backwards and forwards until the left eye sees the same object through the aperture in the left cone, and the two holes appear as one. The distance between the eyes is then indicated on the cross bar, one side of which is divided to inches and tenths, the other to millimetres, ...	$5 00
2035.	DR. THOMPSON'S METAL DISCS, for determining the degrees of Ametropia, ...	4 00
2036.	DR. BADAL'S OPTOMETER, Complete, ...	30 00
2037.	TRIAL GLASSES, Hard Rubber Frames, 5 to 48 inches focus. *Convex*, ...	12 00
2038.	TRIAL GLASSES, Hard Rubber Frames, 5 to 48 inches focus. *Concave*, ...	13 00
2039.	ENAMELED TEST TABLETS, Dioptric System, each, ...	8 00
2040.	GREEN'S TEST DIAGRAMS, for the detection of Astigmatism. This set consists of a card-board dial 12 inches in diameter, divided into 12 equal parts as in a clock dial, to which can be attached separately a series of 14 diagrams of lines and circles made to revolve at pleasure against the face of the dial, ...	5 00
2040.	SNELLEN'S SERIES OF TEST TYPES, bound in paper, ...	2 00

GOLD SPECTACLES.

Fitted with *First Quality only* of Double or Periscopic Convex or Concave *White*, or *Plane Blue* or *Smoke*-colored Glasses.

SINGLE TEMPLES.

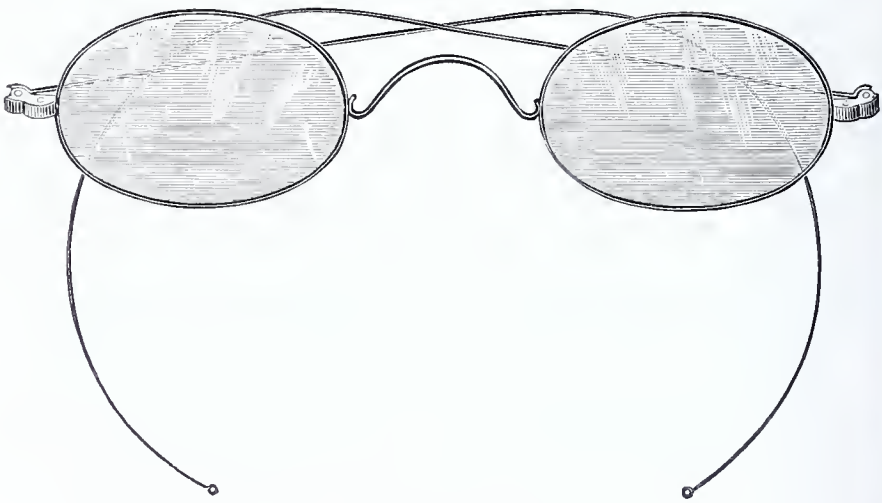


Nos. 2050–2055.

2050.	Single Temples, 8 karat, per pair, ...					$5 50
2051.	" " 10 " "					7 00
2052.	" " 12 " "					8 00
2053.	" " 14 " "					10 00
2054.	" " 16 " "					11 00
2055.	" " 18 " "					12 00

GOLD SPECTACLES.

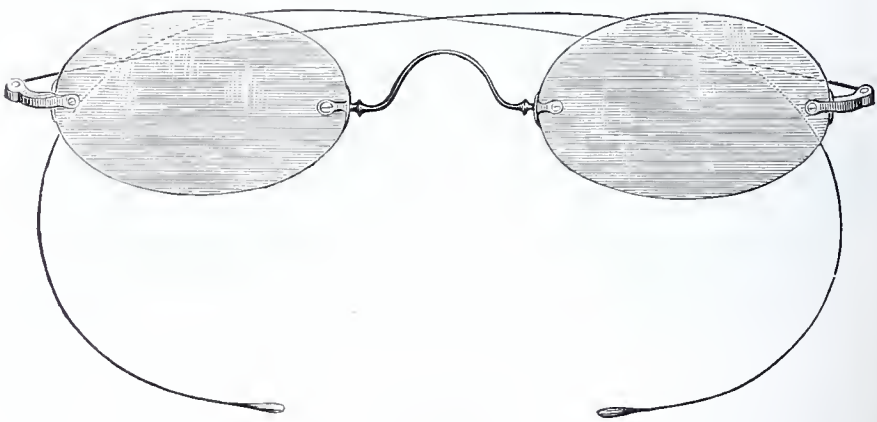
HOOK TEMPLES.



Nos. 2056–2058.

No.						Price.
2056.	Hook Temples,	10 karat,	very light,	. . . . .		$6 00
2057.	"	"	14 "	"	. . . . .	7 50
2058.	"	"	16 "	"	. . . . .	8 50

HOOK TEMPLES (FRAMELESS).

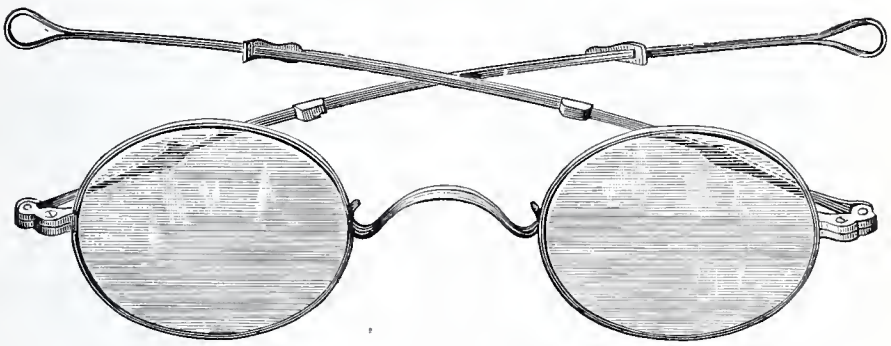


No. 2060.

2060. Hook Temples, frameless, ... $7 50

GOLD SPECTACLES.

SLIDING TEMPLES.



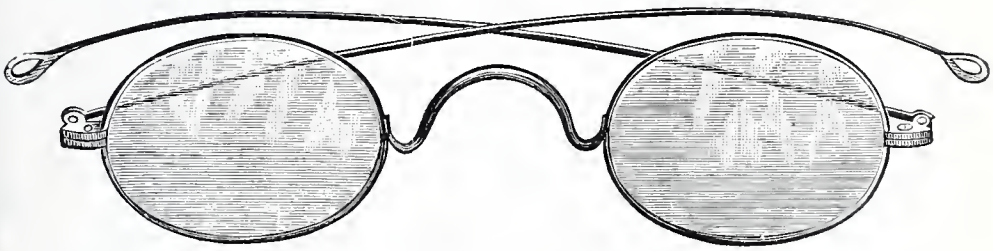
Nos. 2064–2068.

No.							Price.
2064.	Sliding Temples,	10	karat,	per pair,	. . . . .		$9 00
2065.	"	"	12	"	"	. . . . .	10 00
2066.	"	"	14	"	"	. . . . .	11 00
2067.	"	"	16	"	"	. . . . .	13 00
2068.	"	"	18	"	"	. . . . .	15 00

COIN SILVER SPECTACLES.

Fitted with *First Quality only* of Double or Periscopic Convex or Concave *White* Glasses.

SINGLE TEMPLES.

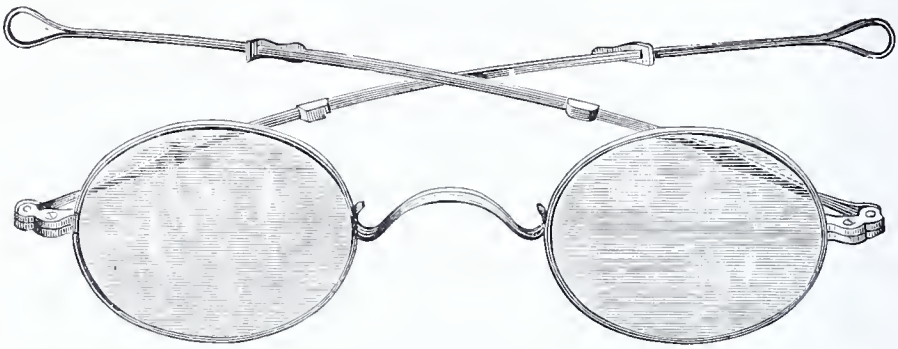


Nos. 2070, 2071.

2070.	Single Temples	per pair, ...		$2 50
2071.	" "	fitted with divided glasses for reading and distant vision, ...		3 50

COIN SILVER SPECTACLES.

SLIDING TEMPLES.



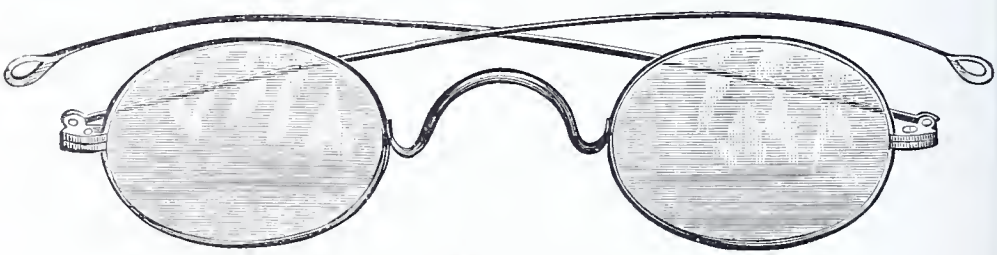
Nos. 2072–2073.

No.		Price.
2072.	Sliding Temples, per pair, ...	$3 00
2073.	" " fitted with divided glasses for reading and distant vision, ...	4 00

ARUNDEL TINTED SPECTACLES.

Fitted with *First Quality only* of *Arundel Tinted*, Periscopic Convex or Concave Glasses.

SINGLE TEMPLES.



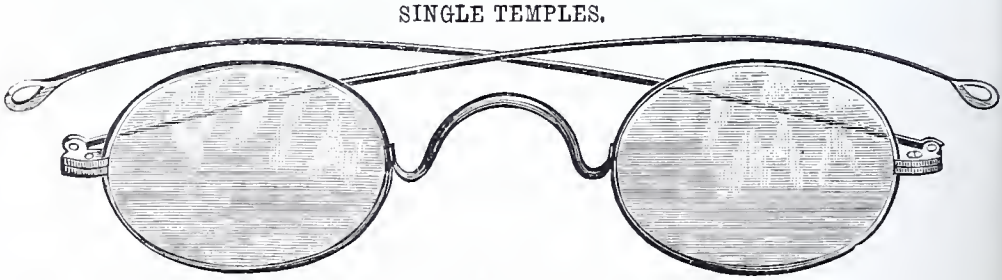
No. 2075.

2075. Single Temples, Finest Steel Frames, ... $2 00

ELASTIC STEEL SPECTACLES.

Fitted with *First Quality only* of Double or Periscopic Convex or Concave *White* Glasses.

SINGLE TEMPLES.



Nos. 2080–2083.

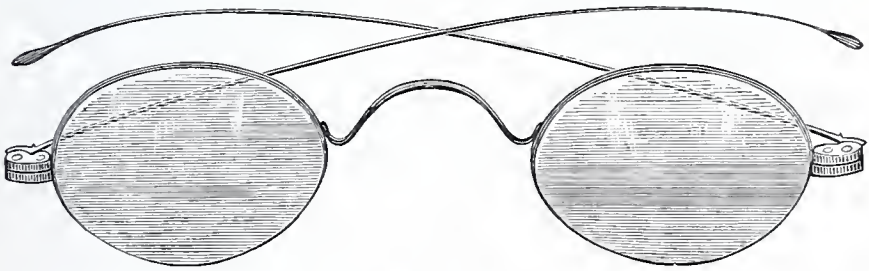
2080. Finest Finished Steel Frames, per pair, ... $2 00

No.		PRICE.
2081.	Fine Finished Steel Frames, per pair, ...	$1 50
2082.	Medium " " " "	1 00
2083.	" " " " fitted with divided glasses for reading and distant vision, . .	2 00

PULPIT SPECTACLES.

Fitted with *First Quality only* of Double or Periscopic Convex or Concave *White* Glasses.

SINGLE TEMPLES.



No. 2085.

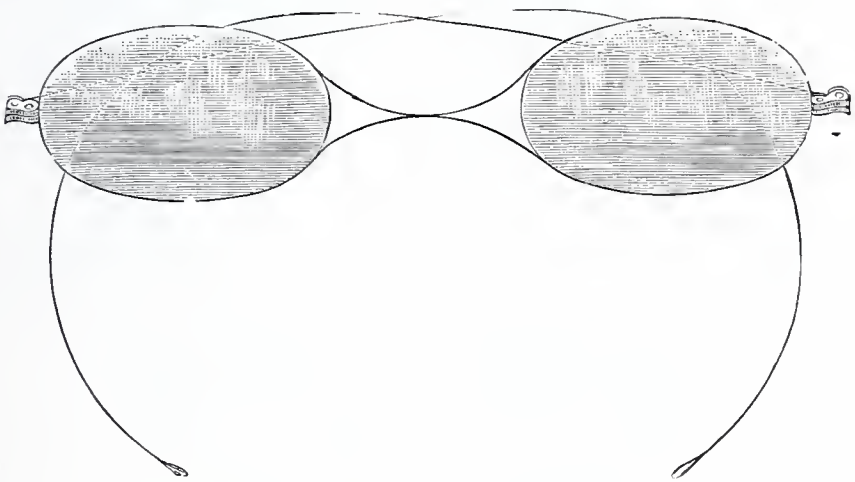
2085. Finest Finished Steel Frames, per pair, ... $1 50

This form of Spectacle Frame is very convenient for public speakers who are obliged to use glasses in reading their notes; as the top being nearly straight allows the wearer to look *over* it when the eyes are directed toward the audience.

INVISIBLE SPECTACLES.

Fitted with *First Quality only* of Double or Periscopic Convex or Concave *White* Glasses.

HOOK TEMPLES.



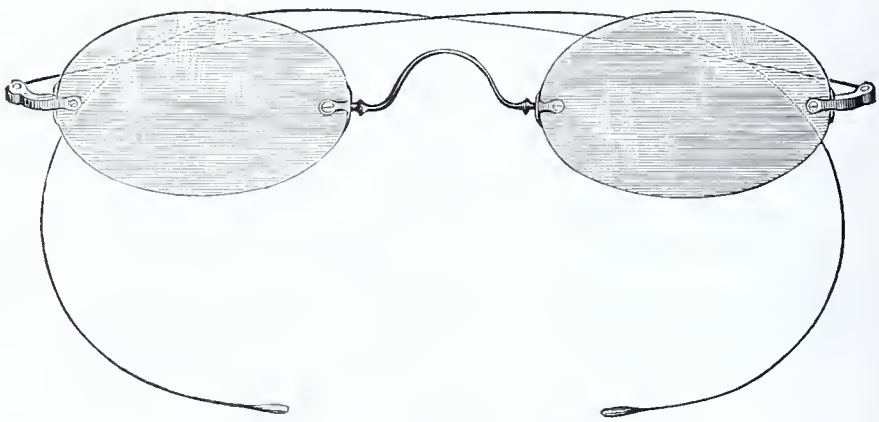
No. 2086.

2086. Finest Finished Hook Temples, of Steel; the frames set in a groove in the glasses, almost invisible, ... $2 50

FRAMELESS SPECTACLES.

Fitted with *First Quality only* of Double or Periscopic Convex or Concave *White* Glasses.

HOOK TEMPLES.



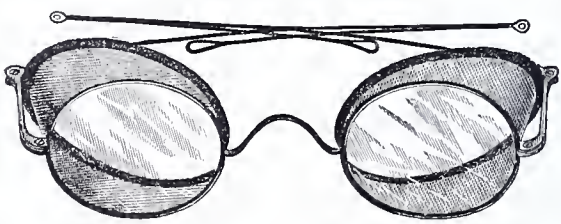
No. 2088.

No.		Price.
2088.	Finest Finished Steel Hook Temples, ...	$2 50

EYE-PROTECTORS.

Nos. 2090–2092.

2090.	Coquille Spectacles, with large egg-shell shaped glasses, either blue or smoke color, for protecting the eyes against an intense glare of light, or from dust. Steel Frames, light Hook Temples,	2 00
2091.	Coquille Spectacles, Medium Finish, Single Temples .	1 00
2092.	" " Ordinary " " " . .	75
2093.	Miller's or Turner's Spectacles, strong frames and large plane white glasses, to guard the eyes against chips, etc., . .	50



Nos. 2095–2096.

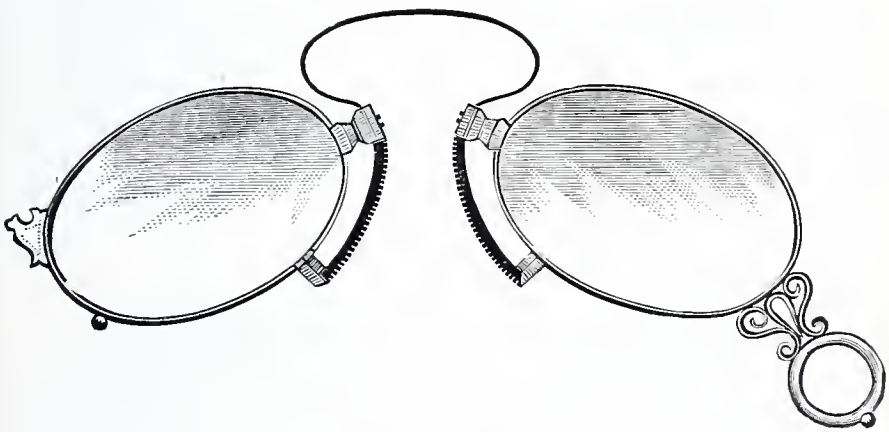
2095. Wire Gauze Eye-Protectors, with Plane Green, Blue, Smoke

No.		Price.
	or White Glasses, and Steel Temples, as in ordinary Spectacles; finest finished frames and glasses, ...	$2 00
2096.	Wire Gauze Eye-Protectors, similar in style to No. 2095, but with medium finished frames and glasses, ...	1 50
2097.	Wire Gauze Eye-Protectors, similar in form and style to No. 2095, but with frames and glasses finished in a more ordinary manner, ...	75
2098.	Wire Gauze Eye-Protectors, similar to the preceding, but fitted with an elastic band in place of the steel temples, . . .	50
2099.	Eye-Shades, with light wire frame fitting on the head like a cap; for both eyes or for one, ...	35

All the Spectacles herein described are furnished with a handsome leather case, without charge, and any of the frames will be fitted with plane green, blue or smoke-colored glasses, at the prices given.

GOLD EYE-GLASSES.

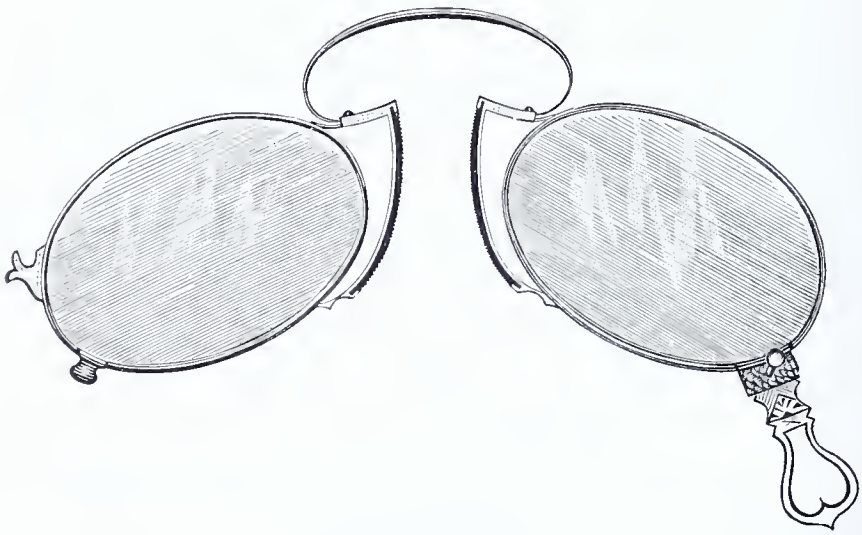
Fitted with *First Quality only* of Double or Periscopic Convex or Concave *White* Glasses.



Nos. 2100–2105.

2100.	Compound Spring Pattern, 8 karat, ...				$5 00
2101.	"	"	" 10 "	. . . . .	5 50
2102.	"	"	" 12 "	. . . . .	6 50
2103.	"	"	" 14 "	. . . . .	7 50
2104.	"	"	" 16 "	. . . . .	9 00
2105.	"	"	" 18 "	. . . . .	10 00

GOLD EYE-GLASSES.



Nos. 2106–2111.

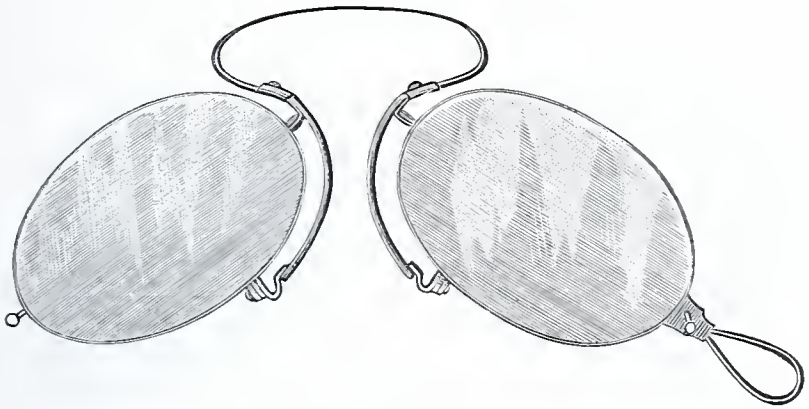
No.					Price.
2106.	Anatomical Pattern,	8	karat,	. . . . .	$5 00
2107.	"	"	10	"	6 00
2108.	"	"	12	"	7 00
2109.	"	"	14	"	8 00
2110.	"	"	16	"	10 00
2111.	"	"	18	"	12 00

No. 2112.

2112. Frameless, with 14 karat Spring and Handle, ... $6 00

ARUNDEL TINTED EYE-GLASSES.

Fitted with *First Quality only* of *Arundel Tinted* Double or Periscopic Convex or Concave Glasses.



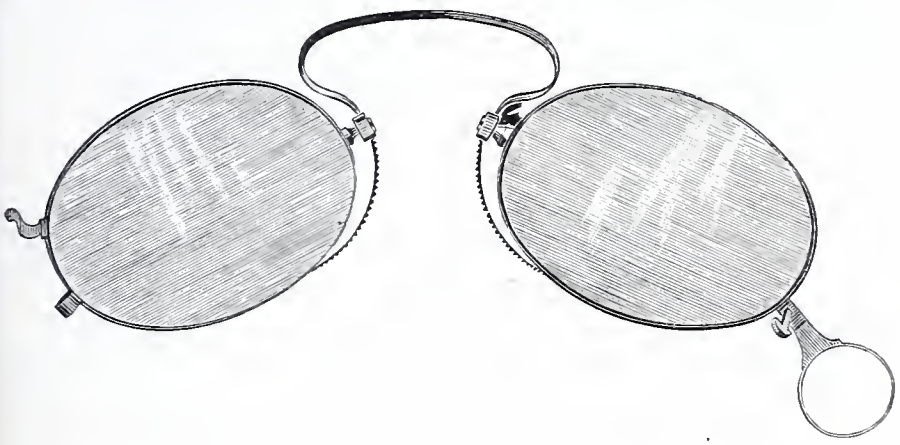
No. 2115.

No.		Price.
2115.	Arundel Pattern, very comfortable, ...	$2 00

These glasses, together with the Arundel Tinted Spectacles, No. 2075, are fitted with slightly tinted glasses, so graduated, that the tint remains of the same density in all foci. They are particularly agreeable for reading by artificial light, and a great help to weak eyes. Being very carefully made and finished they are the handsomest and most desirable of all steel-framed Glasses. If desired they can be furnished in Gold, Shell or Hard Rubber frames.

STEEL EYE-GLASSES.

Fitted with *First Quality only* of Double or Periscopic Convex or Concave *White* Glasses.



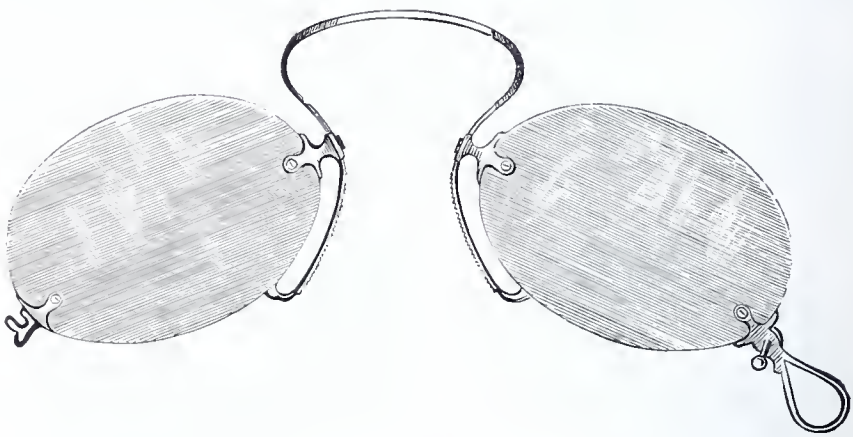
No. 2120.

2120.	Anatomical Pattern, ...	$1 25

STEEL EYE-GLASSES.

No. 2121.

No.		Price.
2121.	Compound Spring Pattern,	$2 00
2122.	" " " very light grooved glasses,	2 50



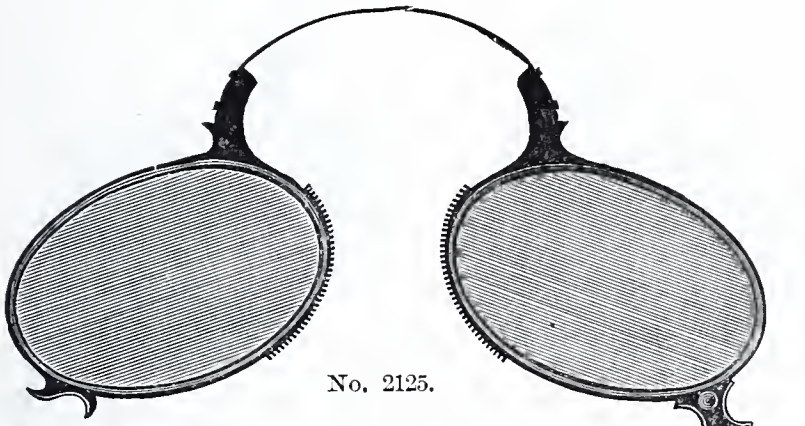
No. 2123.

2123. Frameless Pattern, with Steel Spring and Handle, ... $2 00

All of our Steel Eye-glass Frames are of the lightest possible weight, but so exquisitely tempered as to be much stronger and more durable than those usually sold. They are furnished either blued or of the light bronze or straw-color now so much used, as may be desired.

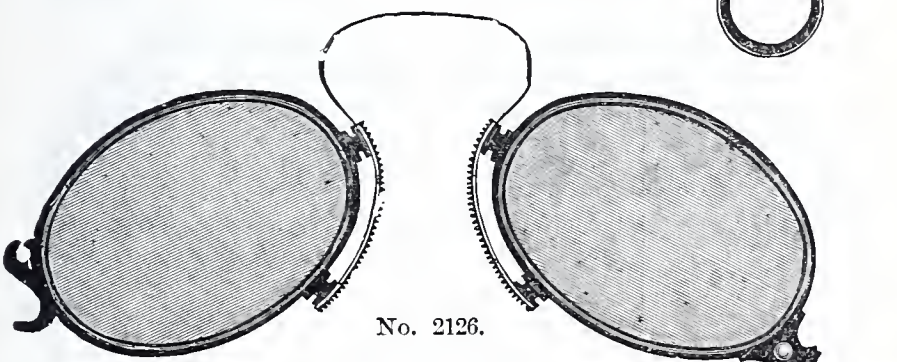
SHELL EYE-GLASSES.

Fitted with *First Quality only* of Double or Periscopic Convex or Concave *White* Glasses.



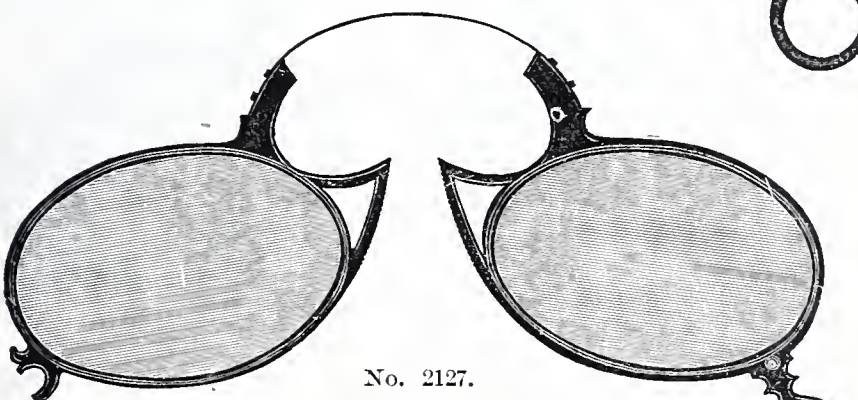
No. 2125.

2125. Simple Spring Pattern, ... $2 00



No. 2126.

2126. Compound Spring Pattern, ... $2 50

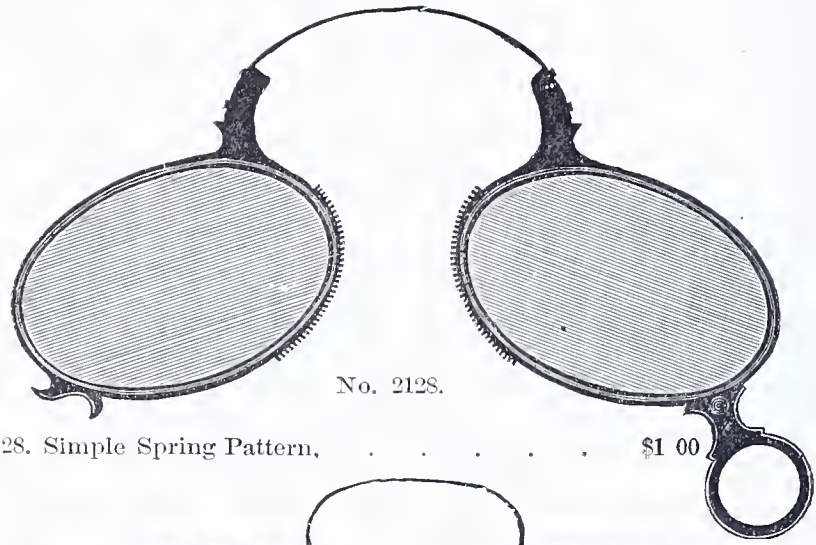


No. 2127.

2127. Anatomical Pattern, ... $2 50

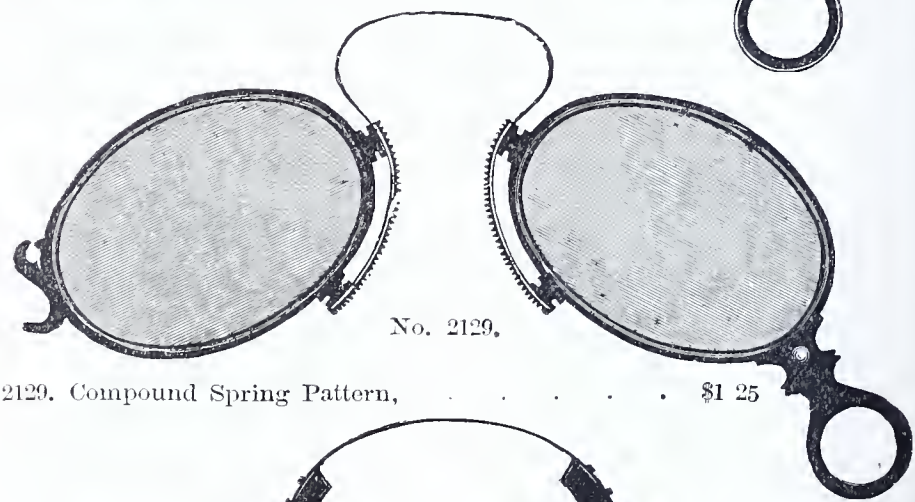
HARD RUBBER EYE-GLASSES.

Fitted with *First Quality only* of Double or Periscopic Convex or Concave *White* Glasses.



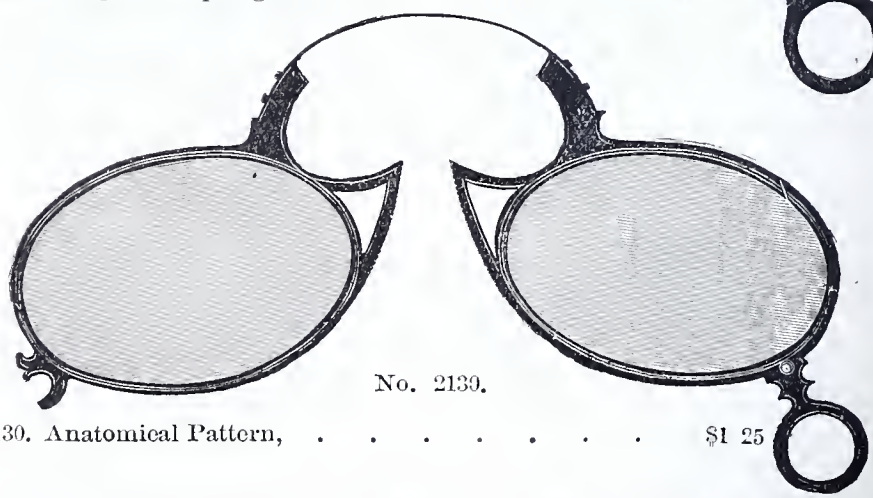
No. 2128.

2128. Simple Spring Pattern, ... $1 00



No. 2129.

2129. Compound Spring Pattern, ... $1 25



No. 2130.

2130. Anatomical Pattern, ... $1 25

All the foregoing Eye-glass Frames will be fitted with either *plane blue* or *smoke-colored* glasses, and furnished with a case and silk guard, without increase of cost.

SPHERICAL SPECTACLE LENSES.

Spherical, Cylindrical or Prismatic Lenses, of the *First Quality only* fitted to frames at the following prices:

No.		Price.
2135.	Periscopic or Double Convex White Lenses, from 5 to 72 inches focus, per pair,	75
2136.	Periscopic or Double Convex White Lenses, from 1 to 4¾ inches focus, per pair,	$1 25
2137.	Double Convex White, Divided or Franklin Lenses, per pair,	1 50
2138.	" " " Lenses, two foci on one glass, "	1 50
2139.	Periscopic or Double Convex Tinted Lenses, Blue, Pink, Green or Smoke, per pair,	1 50
2140.	Periscopic or Double Concave White Lenses, from 5 to 72 inches focus, per pair,	75
2141.	Periscopic or Double Concave White Lenses, from 1 to 4¾ inches focus, per pair,	1 25
2142.	Periscopic or Double Concave Tinted Lenses, Blue, Pink, Green or Smoke, per pair,	1 50
2143.	Plane, Blue, Green or Smoke-colored Glasses, per pair,	1 00

CYLINDRICAL SPECTACLE LENSES.

2145.	Plano-Convex or Concave Cylindrical White Lenses, per pair,	2 00
2146.	" " " " " single lens,	1 25
2147.	Sphero-Convex " " " " per pair,	4 00
2148.	" " " " " single lens,	2 50
2149.	Plano-Convex or Concave Cylindrical and Prismatic White Lenses, per pair,	4 00
2150.	Plano-Convex or Concave Cylindrical and Prismatic White Lenses, single lens,	2 50
2151.	Sphero-Convex or Concave Cylindrical and Prismatic White Lenses, per pair,	5 50
2152.	Sphero-Convex or Concave Cylindrical and Prismatic White Lenses, single lens,	3 00
2153.	Crossed Cylindrical Lenses, Convex or Concave, White, per pair,	7 00
2154.	" " " " " " single lens,	4 00

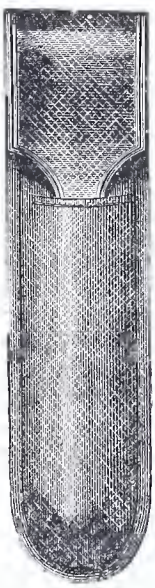
PRISMATIC SPECTACLE LENSES.

2160.	Plane Prismatic Lenses, White, per pair,	2 00
2161.	" " " single prism,	1 25
2162.	Sphero-Prismatic " " per pair,	4 00
2163.	" " " single prism,	2 50

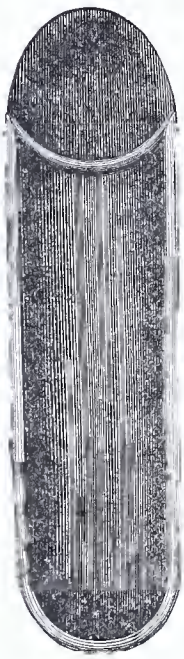
PEBBLE SPECTACLE LENSES.

2165.	Periscopic or Double Convex Pebble Lenses, per pair,	3 00
2166.	" " Concave " " "	3 00

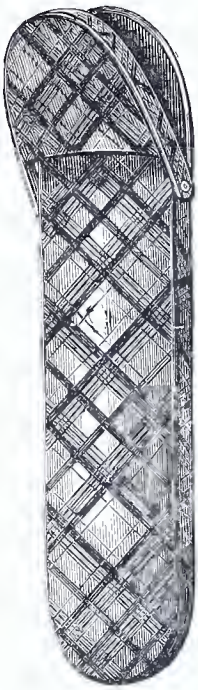
SPECTACLE AND EYE-GLASS CASES.



No. 2170.



No. 2171.



No. 2173.

Nos. 2175–2176.

No. 2181.

No.		Price.
2170.	Spectacle Case, Morocco, with tuck,	20
2171.	" " " open end,	20
2172.	" " Fine English Leather,	75
2173.	" " Scotch Plaid Frog Mouth,	50 to 1 50
2174.	" " German Silver, Plated,	1 25 to 1 75
2175.	Velvet Chatelaine Case,	1 00 to 3 00
2176.	Morocco " "	75 to 2 00
2180.	Eye-Glass Case, Morocco, open end,	15
2181.	" " Finest Russia Leather,	35
2182.	" Hooks, Gold,	1 50 to 5 00
2183.	" " Gilt,	25
2184.	" " Steel,	15
2185.	" Chains, Gold, with Hook,	4 00 to 6 50
2186.	" Guard, Pure Silk,	10
2187.	" " Catgut,	10

We append below a few brief references to Thermometers and other scientific instruments, which will be fully illustrated and described in Part Second of our Catalogue (now in course of preparation).

CLINICAL THERMOMETERS, (Self-Registering.)

We have given great attention to the manufacture of these instruments, which are useless if not entirely accurate, and are certain that in all respects those we now offer to the profession are superior to any heretofore sold in the United States. One of the greatest imperfections in all others has been the obliteration of the scales by the action of perspiration, etc. This we have entirely obviated by using a black enamel in the scales and figures, which we guarantee indestructible, except by violence: and by a constriction (patented) in the tube, the union of the index and column of mercury is rendered almost impossible. Each thermometer is guaranteed to be correct, but if desired we can furnish them with the Kew verification for an additional charge of fifty cents each. The prices are as follows:

3½-inch in Ebony or Boxwood case,	$2.50
4 " " " "	2.75
5 " " " "	3.00
6 " " " "	3.50
5½-inch Patent Surface Thermometer, exceedingly sensitive, in fine snap Morocco case,	5.00
Steward's Patent Insulated Surface Clinical Thermometer, in Morocco case,	20.00

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This is a very superior Self-registering Thermometer, for in-doors or out, (maximum and minimum,) constructed on Six's principle, in white enameled tin cases, with porcelain or enameled glass scale; of a novel and original design, and guaranteed correct, ... $5.00

Urinometers of every description, **Opthalmoscopes, Hygrometers, Thermometers** of all kinds and prices. Sets of **Trial Lenses** for Oculists, **Optometers** of various forms, **Spectacles** and **Eye-Glasses, Eye-Protectors, Aneroid** and **Mercurial Barometers, Anemometers, Wind** and **Rain Gauges, Hydrometers,** and every description of Meteorological Instruments, will be kept in stock or imported to order.

ANEROID BAROMETERS.

Of all sizes and grades, in Brass, Nickel and Silver cases, for ordinary Meteorological Observations, or for measuring heights, from $3.50 to $50.00 each.

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AND OTHER

SCIENTIFIC INSTRUMENTS.

Any work in the following list, will be mailed free to any address in the United States or Canada, or receipt of the price.

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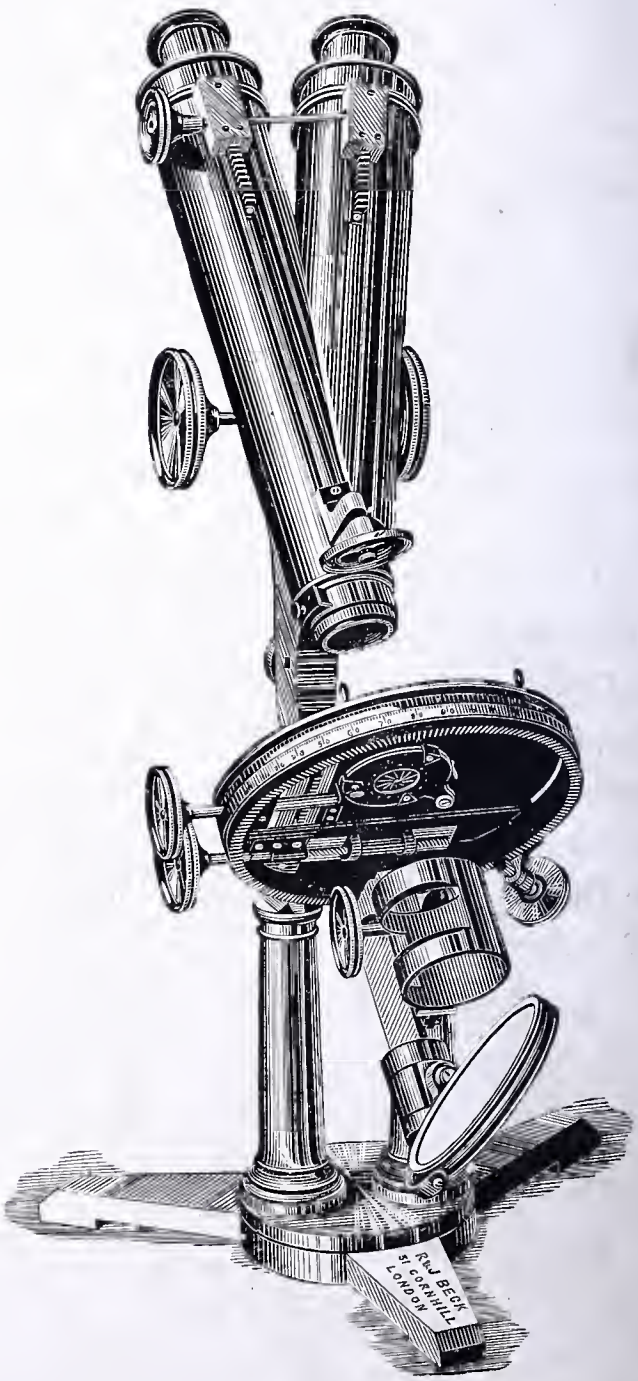
The present or *Third* edition of our American Catalogue completes the list of Optical Instruments and Accessories. Its bulk has grown to such an unexpected extent that we deem it expedient to issue a Second Part (*now in course of preparation*), which will contain fully illustrated descriptions of Thermometers and Barometers of every description, Compasses, Anemometers or Wind Gauges, Rain Gauges, Hydrometers, Hygrometers and Urinometers.

The expense attending the issue and postage of these Catalogues is so great that we shall feel obliged if our friends in sending for them will enclose *Ten Cents* in stamps or currency, which will tend somewhat to defray the cost.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